TECHNOLOGY DEPT.

Gas Journal

Vol. 268. 103rd Year. LONDON, OCTOBER 31, 1951. No. 4613. Price 1/3

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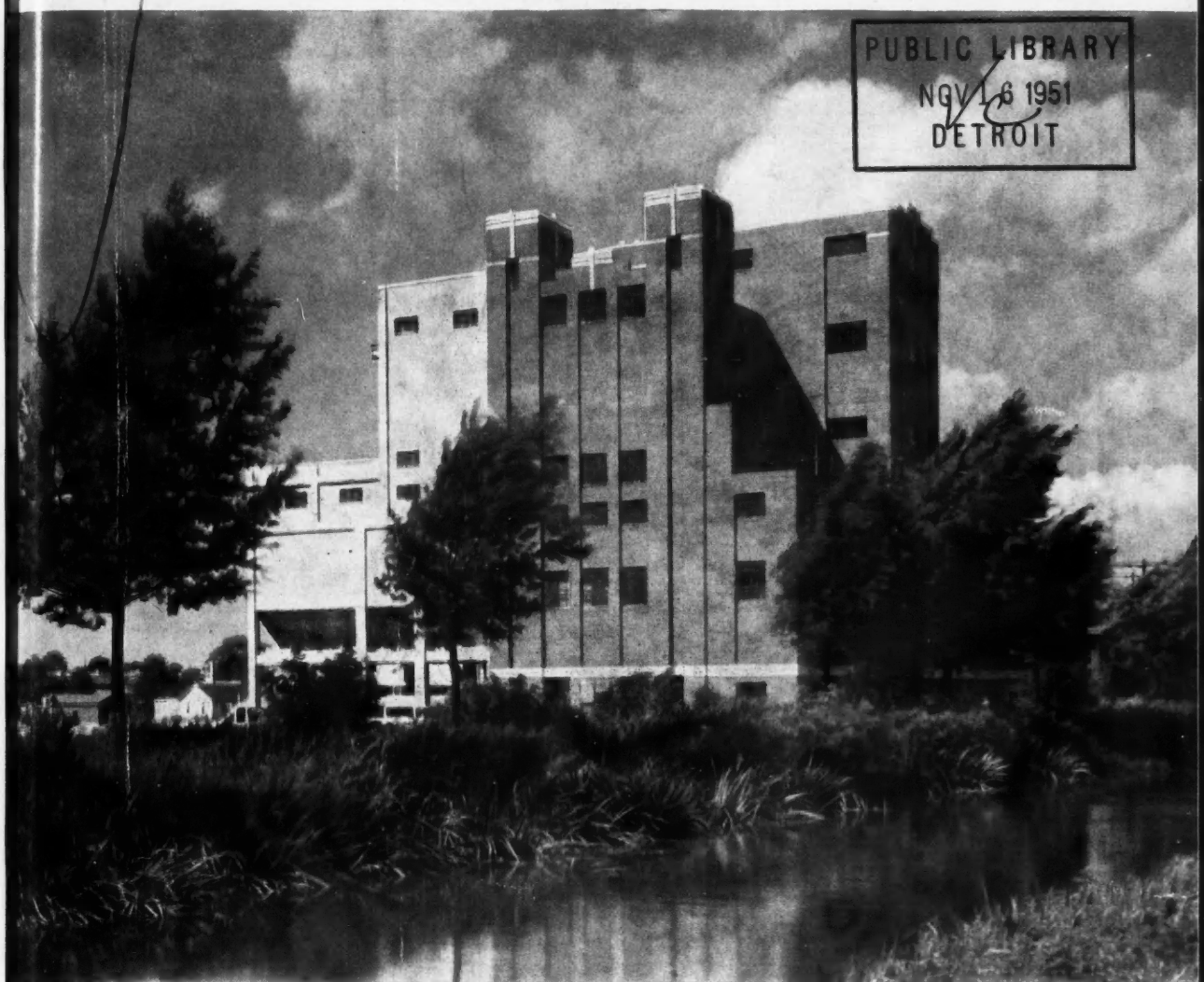

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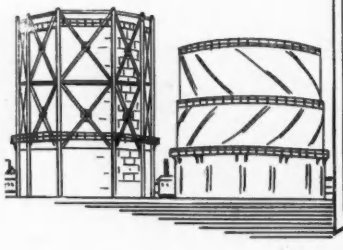

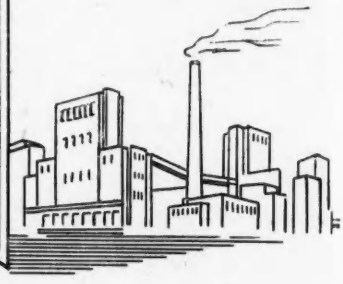

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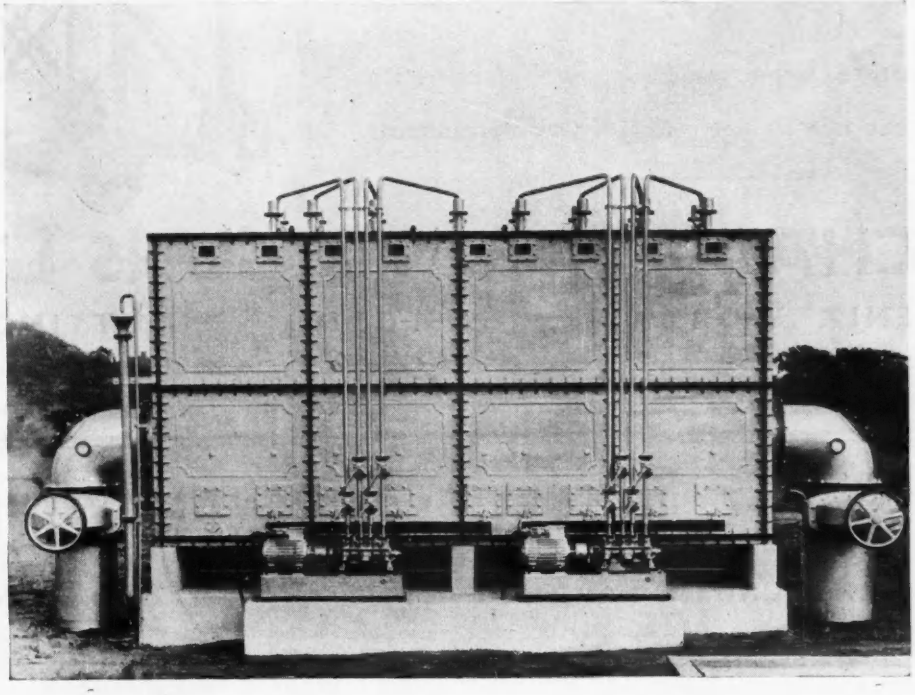

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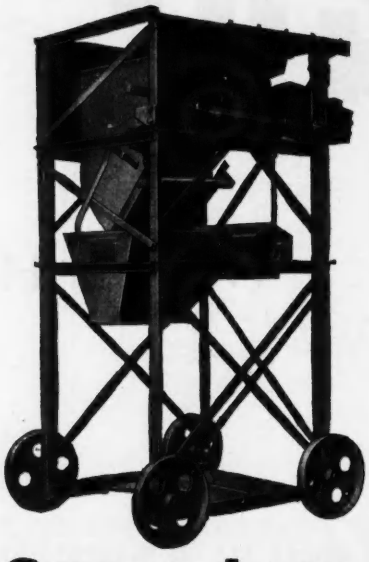

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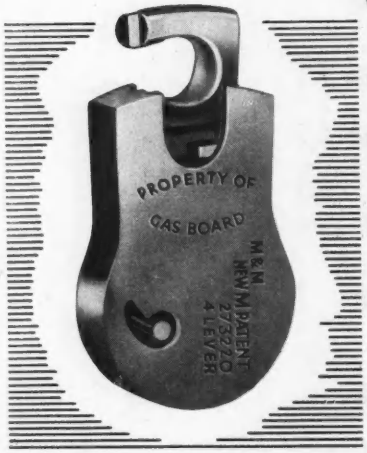

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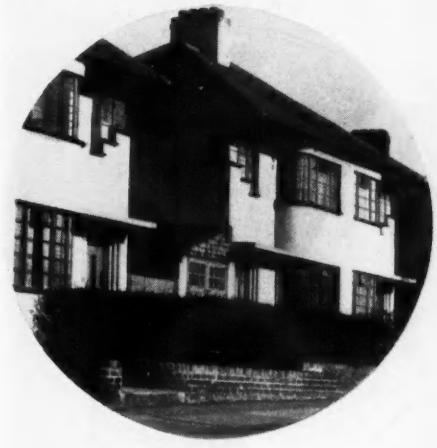

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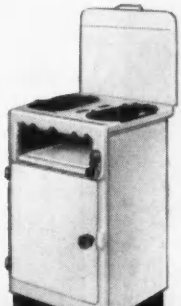

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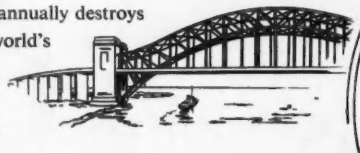

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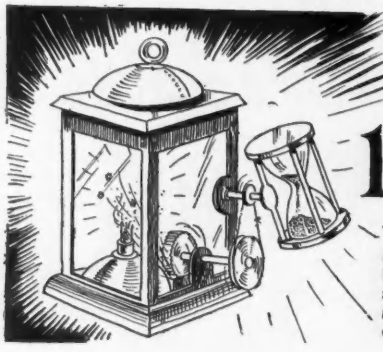

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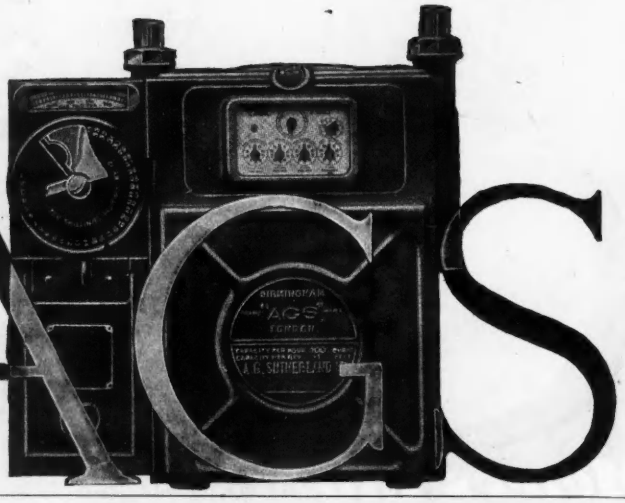

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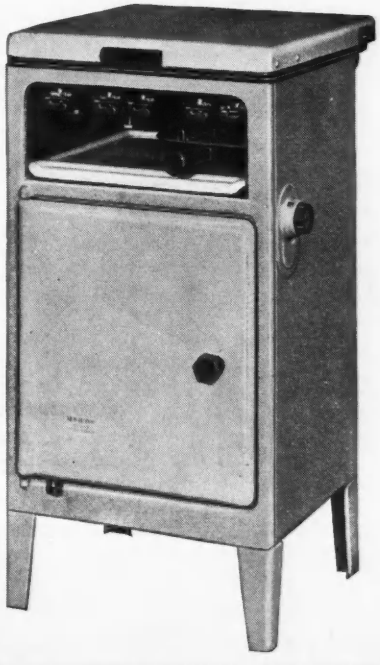

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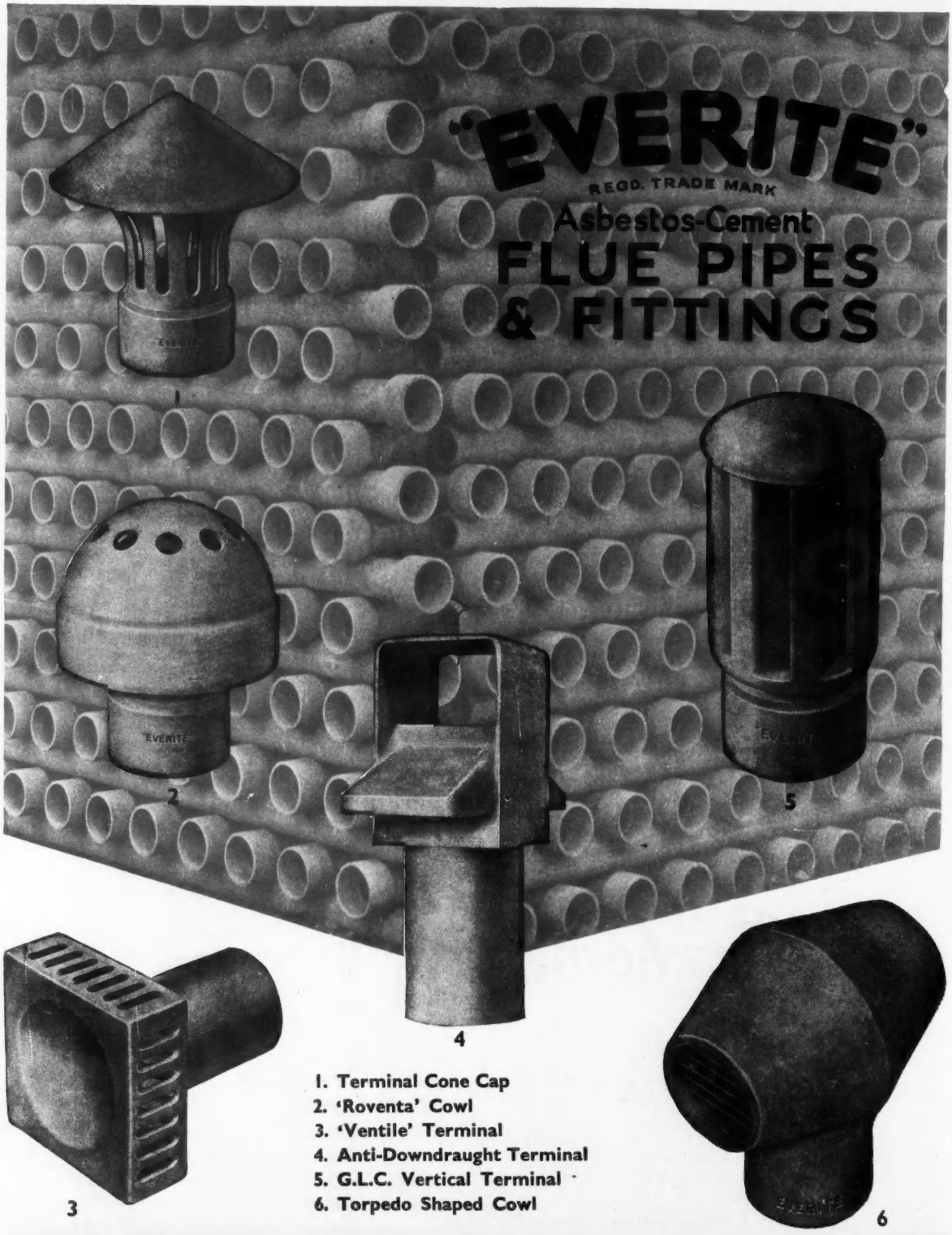

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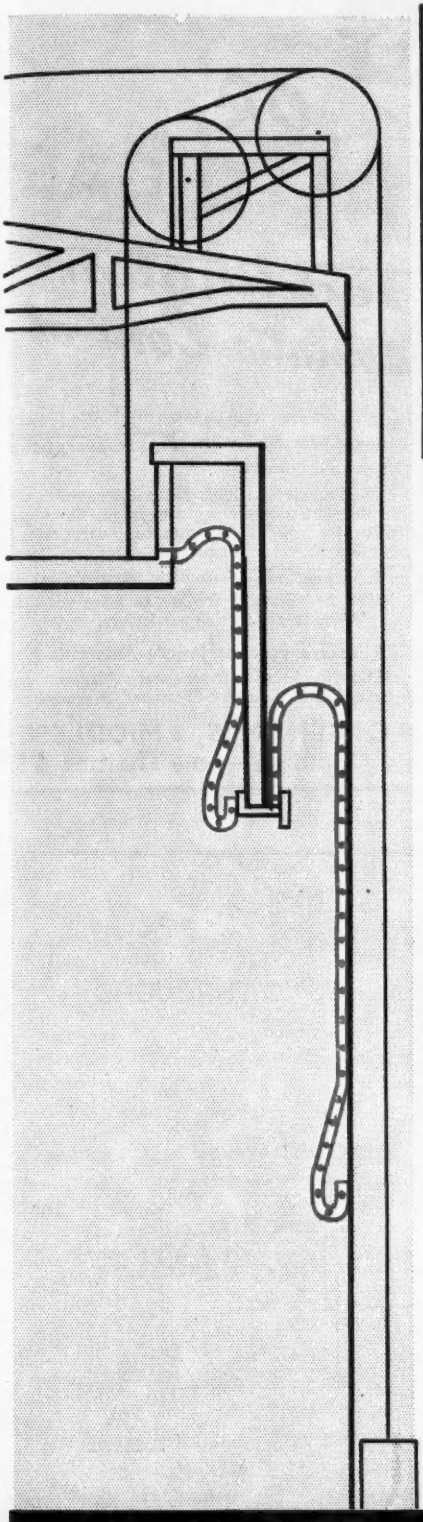

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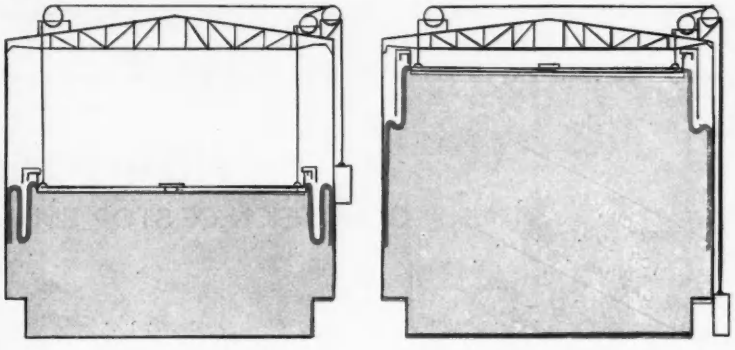

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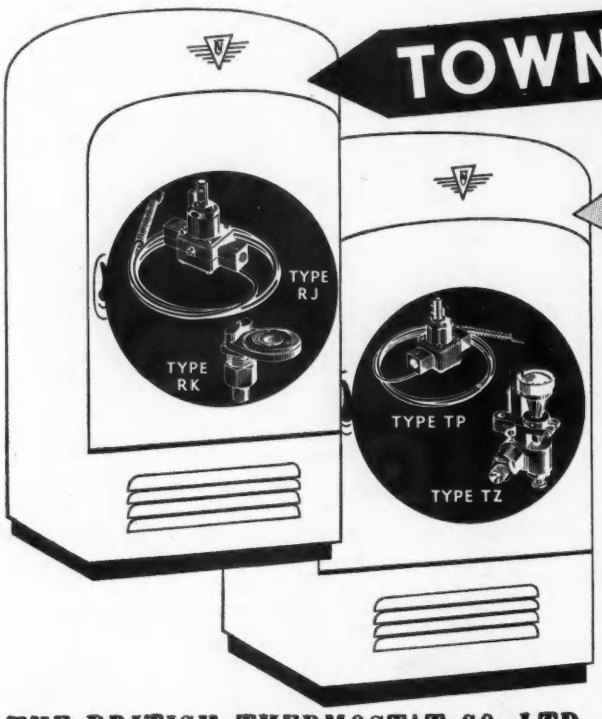

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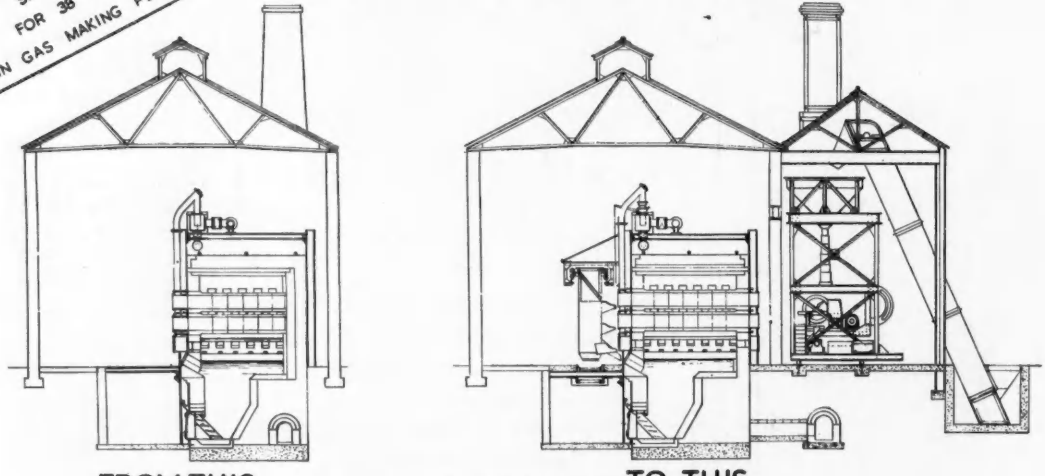

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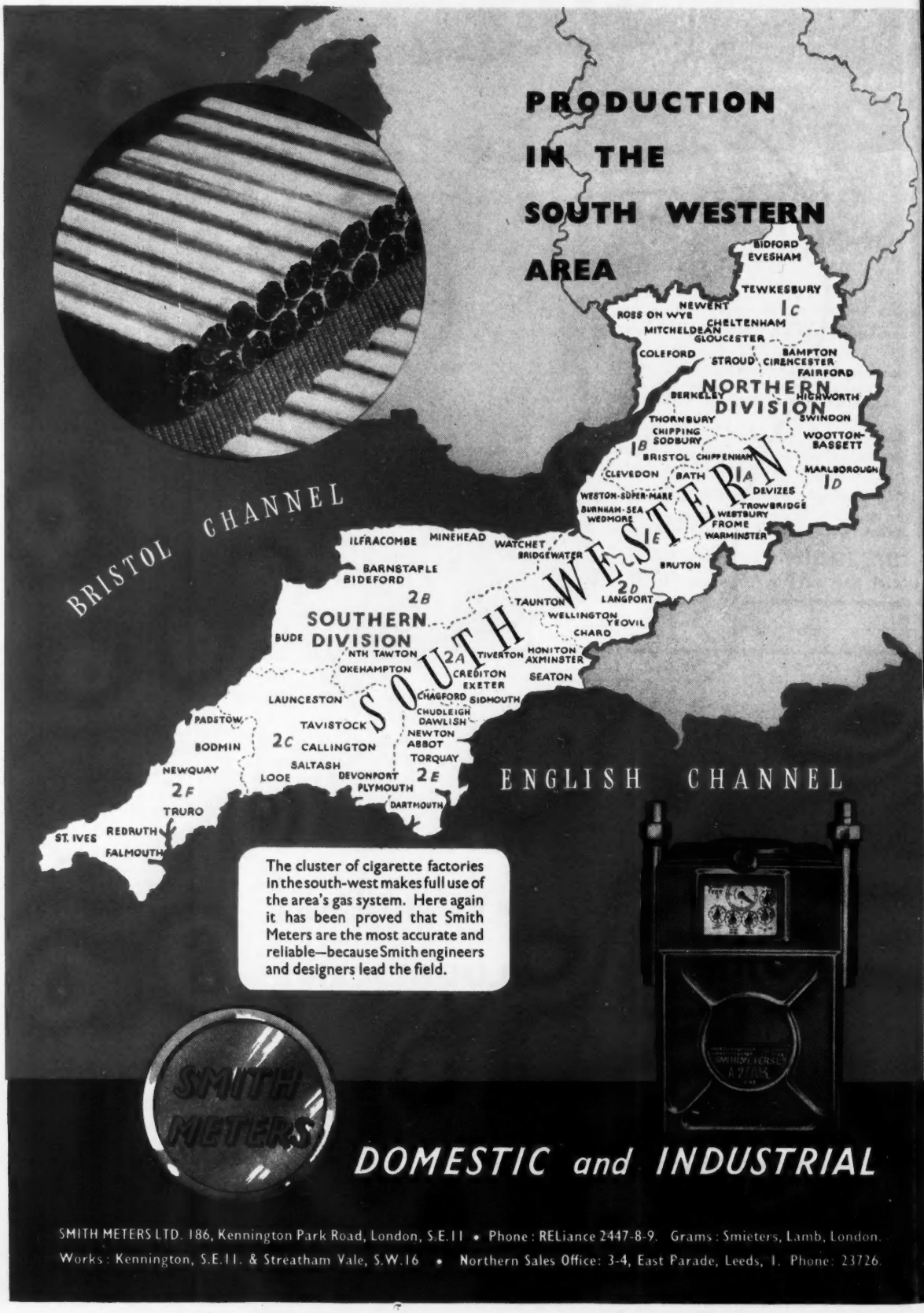

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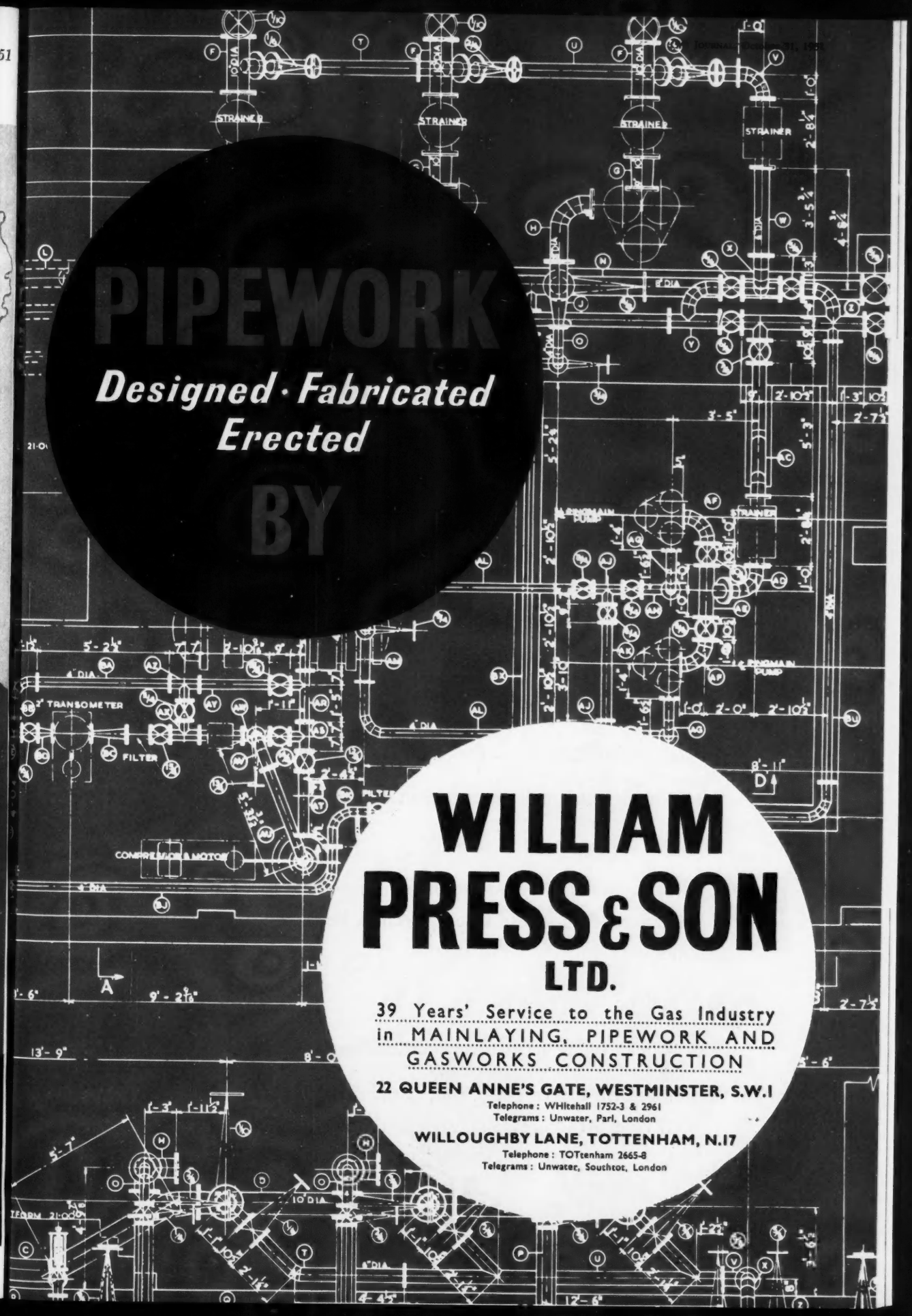
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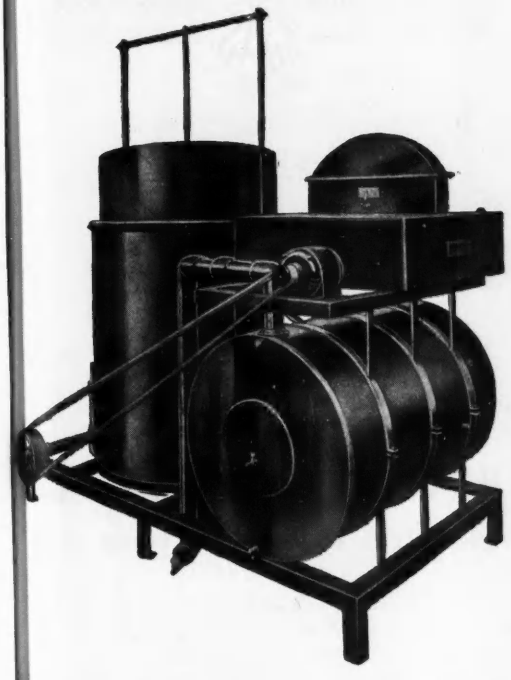

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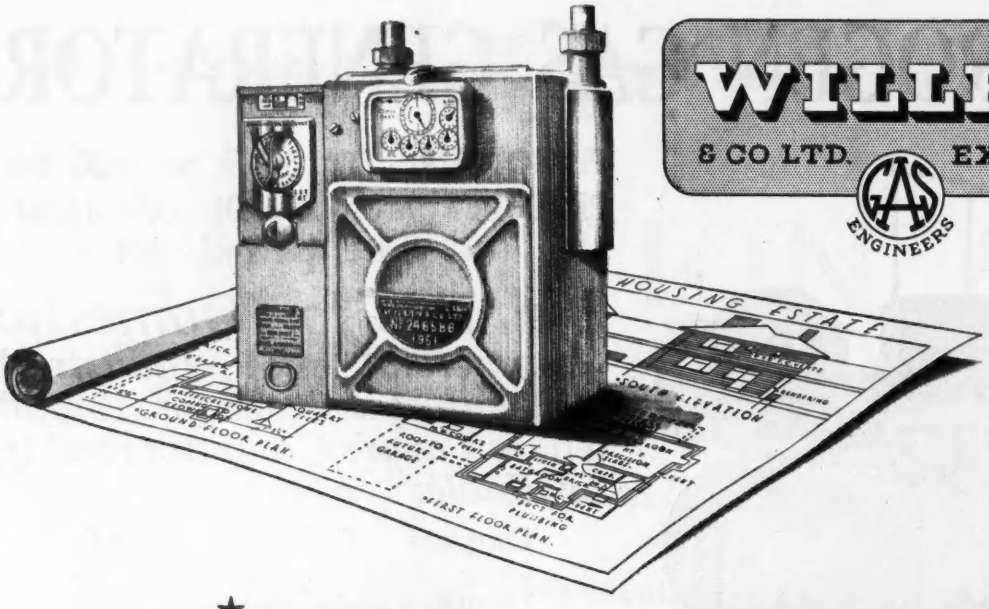

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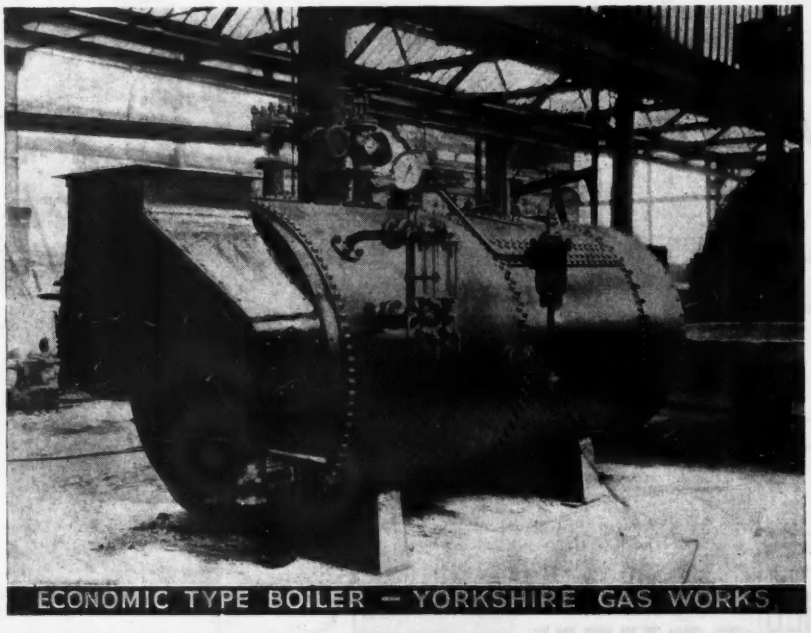
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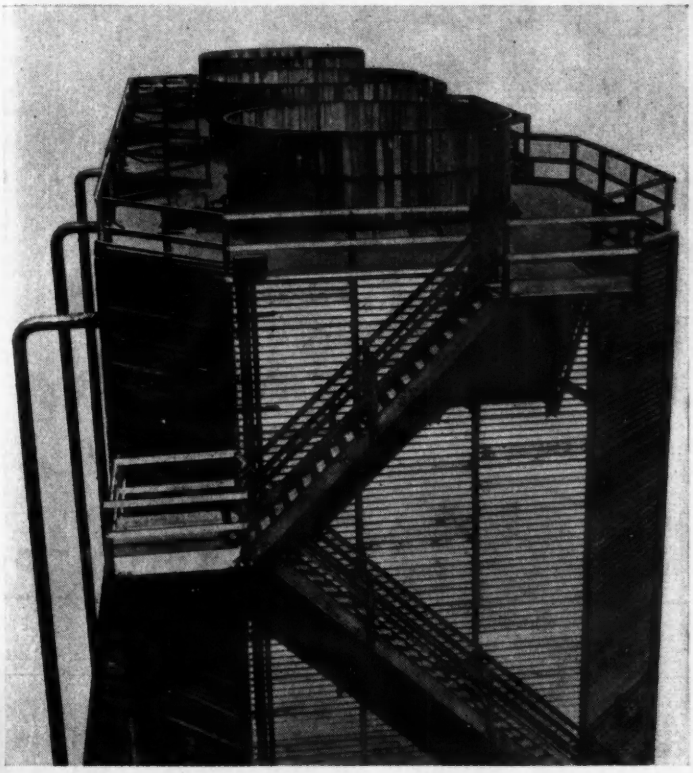

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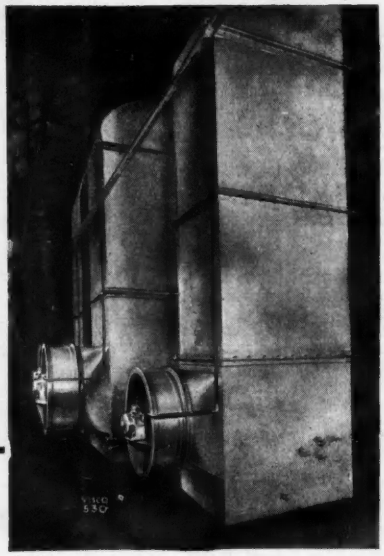

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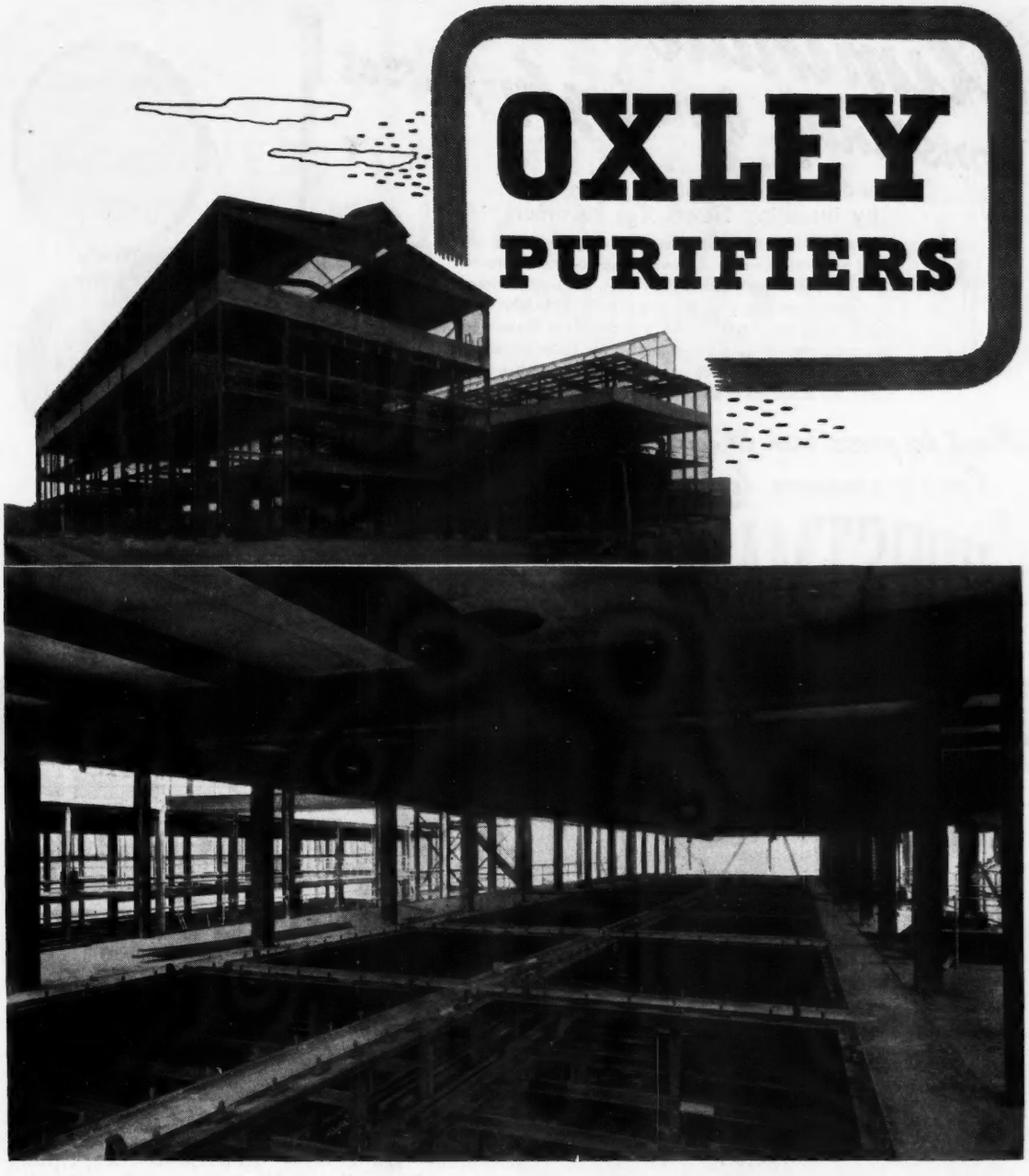

Above: M.S. electrically-welded purifiers in steel buildings, under erection at Howden. Installation comprises three sets of purifiers, each set including 4 boxes, 40 ft. by 30 ft. by 8 ft., with 24 in. bore mains and reverse and divided flow valves.

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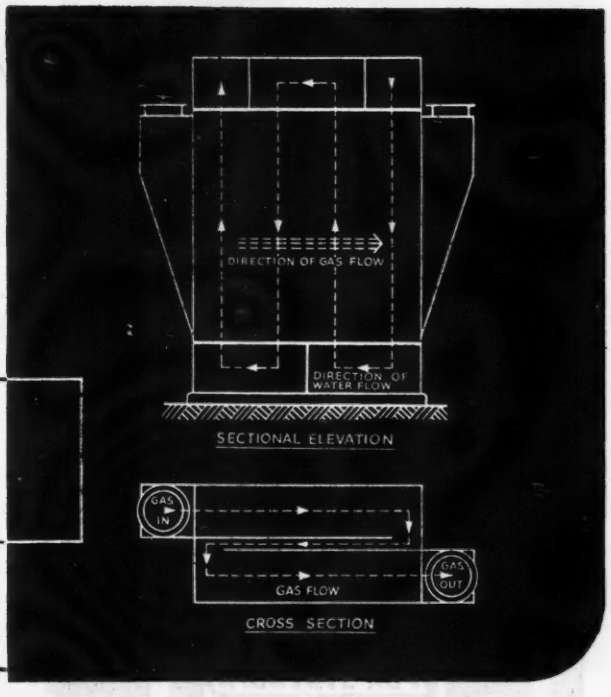

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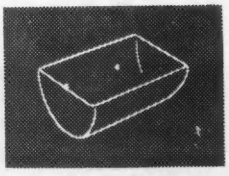

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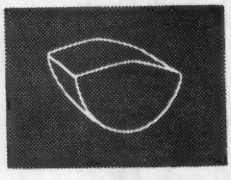

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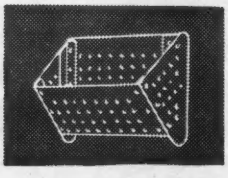

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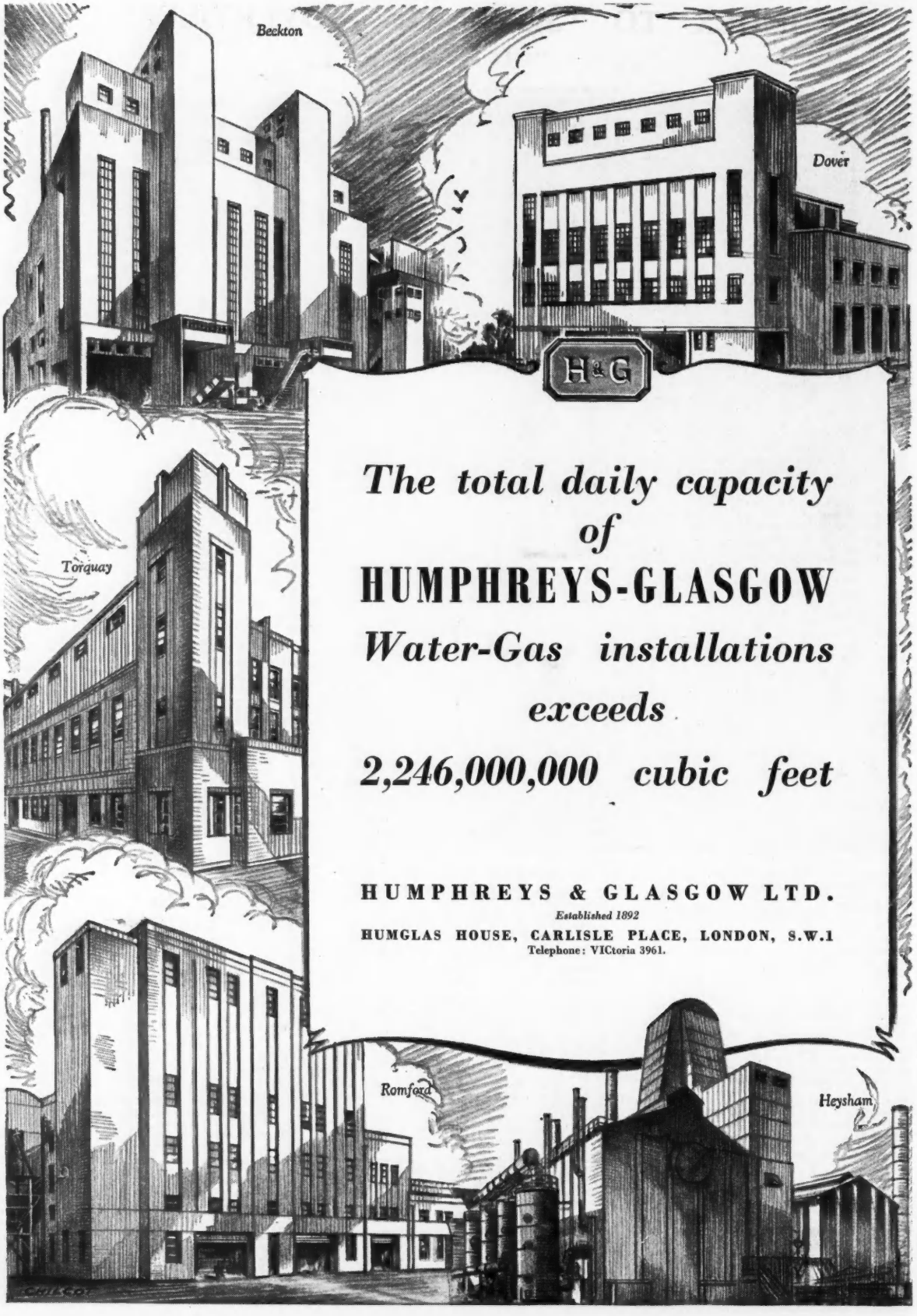

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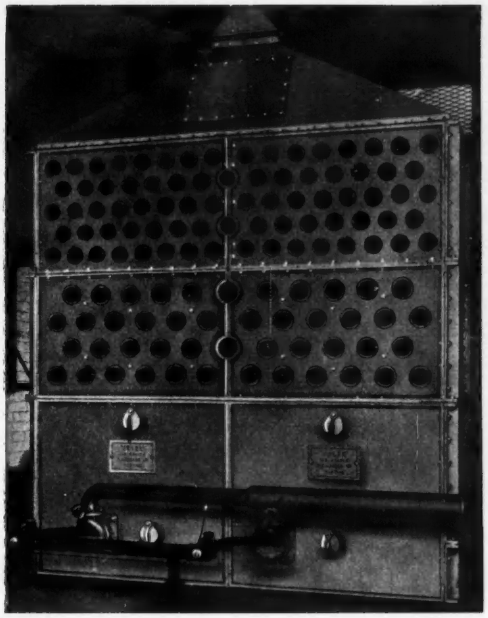

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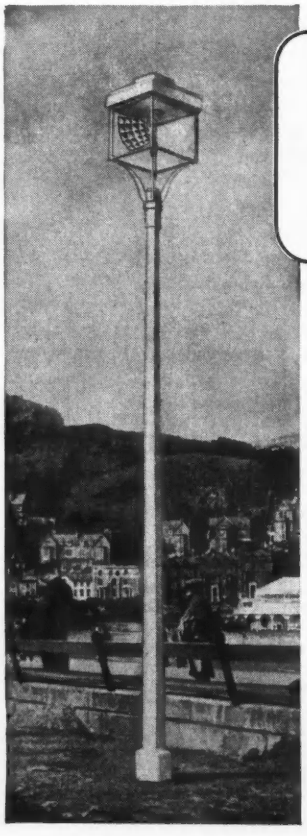

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GAS JOURNAL

VOL. 268. No. 4613 103RD YEAR OCTOBER 31, 1951

A 'ONE-AND-A-HALF' FUEL INDUSTRY

FROM many responsible sources and on various platforms there has been renewed insistence lately that the gas industry must regard itself as an industry supplying gas *and* coke and should not sacrifice its coke market—*i.e.*, coke consumers to whom it has been suggested that coke is a 'good buy'—whenever the demand for gas makes it convenient for the industry to gasify the coke it produces. It is argued—and it is a just contention—that encouragement of the installation of coke fires followed by inability to supply the fuel when these fires are needed in cold weather is, to say the least, a peculiar policy. It is argued with equal force—and, we think, with similar justification, that an industry which claims to sell solid smokeless fuel should be capable of stocking that fuel against demand. Apart from low pressures during cold spells, there is almost 100% continuity of gas supply. On the other hand, coke stocks show the most extraordinary fluctuations, and many laymen simply cannot understand why gas undertakings, instead of taking advantage of mild winters to lay-in stocks of coke, become panicky and adopt bizarre methods to get rid quickly of every ton in hand. The aim should be continuity of service—that is, if catering for the coke market is *per se* a proper policy—and provision should, it is maintained, be made to meet demands varying according to the weather encountered during successive winters. We referred to this phase of the gas industry's responsibility only a few weeks ago (*Journal* of October 10) when commenting on the views put forward at the time by the Coke Manager to the Eastern Gas Board. Expense, we mentioned, is involved in providing adequate stocking facilities to even out demand and supply. But we pointed out that a long-term stocking policy can result in overall economy and consumer satisfaction—that over a period of years production of coke can, by planned stocking arrangements, be more nearly made to match demand, with assured benefit from the prestige angle.

This 'two-fuel' slogan becomes more interesting with the fuller publication of how gas undertakings have, or have not, tackled the coke market. Judging from information recently made public, the 'two-fuel' slogan is wide of the mark, and the best that can be said is that the gas industry aims at being a 'one-and-a-half' fuel industry. In 1949 (*vide Journal* of October 10) out of about 90 works in the Eastern area 48 had no coke screening plant at all, 12 had inadequate plants; of the remaining 30 not more than 24 had modern fully-equipped plants. Few works had tackled coke sales seriously. Still more recently evidence has been forthcoming from the North Western area. One of the papers presented at the staff conference of the North Western Gas Board dealt with conditions in the Furness group of undertakings. In 1949 not one of the undertakings in that group had coke screening plant; none had adequate storage accommodation. Shovel handling from the ground was the order of the day. For a 'two-fuel' industry, the marketing methods for solid smokeless fuel were crude. The information was contained in a paper by Mr. William Oldham—see later pages. It is, we feel sure, an extremely healthy sign that the picture should be painted in natural colours; it is a sign of strength, not of weakness. Even when the boards have carried out progressive schemes for improvement, it is to be hoped that weaknesses, if they exist (and no doubt they will exist), will be frankly and openly discussed. But we will not expand this theme, which is concerned with a 'one-and-a-half' fuel industry.

At the same conference of the North Western (last week's *Journal*), Mr. T. D. Olver, Production Engineer, Manchester group, N.W.G.B., also directed thought to the coke market, pointing to the ways in which integration can help to improve matters. He spoke of the fickleness of the market. Twelve months ago there was in the area 10 times as much coke as there is

today, and now difficulty is being experienced in supplying customers who have been recommended to purchase coke appliances. 'This shortage of coke is not because the public has suddenly become aware of the "glowing" properties of coke, but because there are insufficient supplies of coal to satisfy the industrial and domestic market. Twelve months ago we were exporting and all of us were clamouring to contribute our quota to the shipment. This winter we should be glad to hear that coke is being imported.' It is in the levelling-out of supply and demand, which we have emphasised is of importance, that integration could help. In the past coke screening plants were usually designed to handle maximum production, not maximum demand. In future design plant should be included of adequate size to meet maximum requirements. Mr. Olver maintains that the increase in capital cost will be offset by the saving in the maintenance of overworked plant and in wages needed in overtime. New coke plant in the Manchester group is being planned with this in mind.

NORTH WESTERN INTEGRATION

THE North Western conference was most encouraging and incidentally it got, as well as an excellent Press, an honourable mention in the Nine O'clock News. The Chairman of the N.W.G.B., Mr. D. P. Welman, covered a great deal of ground in a rousing address at the end of the meeting. We reported his comments last week, and we draw particular attention to what he had to say on nationalisation and to his remarks on the plans for linking up the whole of the north western industrial belt by what he described as Britain's largest gas grid. 'Serving more than 5 mill. people through some 10,000 miles of main, the grid when completed,' he said, 'will be the most extensive in the country.' It is good to have a spice of rivalry in a nationalised industry, and no doubt the North Thames will note North Western aims and claims—we almost wrote North Western 'challenge.' We very much liked Mr. Welman's address, on account of its content and also because Mr. Welman is a very good speaker. He contended that the industry was basically not one to be used as shuttlecock for party politics, and that if the industry could keep clear of political contact, then nationalisation would be the biggest boon ever given to any industry. How nationalisation can be divorced from political influence we do not know, but we hope we are right in interpreting Mr. Welman's views in saying that the stage has been set for enormous advances executed within and by the industry, uncoloured by political party ideology.

The opportunities before the smaller group were outlined by Mr. William Oldham, of Furness, those before the larger group by Mr. Olver. Both their papers fitted into the general integration scheme, and the scheme adheres in fundamental respects to a pattern of the utmost promise. We have read these papers with the greatest possible interest. We use the word 'pattern,' and in doing so refer more specifically to the balance of production plant outlined so clearly by Mr. Olver—and what a change in outlook coupled with application there has been in recent years. The Manchester group project alone is in terms of output vastly different from pre-war conceptions. Coke oven plant is to be installed at Partington, and it will have independent staff and independent costing. The transmission plant for dealing with the output of plant already installed or planned for erection at Partington has a daily capacity of nearly 80 mill. cu.ft. With interlinkage between manufacturing and distributing centres comes the opportunity to develop the most economical load factors by absorbing peak load periods through higher constant volume transmission between holder stations during the 24 hours of the day. Gasworks with horizontal, continuous vertical, or intermittent vertical retorts will operate under base load conditions, the load variation for the grid being taken at the coke ovens—and mechanically operated carburetted water gas plant equipped for carburetting with heavy oil will play an important part in future extensions. The coke oven plant will be linked up with existing gasworks plant of the most economic size. Manchester's programme of integration is already under way.

SMOKE AND LATENT POWER

PREOCCUPATION with immediate problems sometimes prevents us taking the long term view; we cannot see the wood for the trees. Particularly is this true of industry, where the imminent crisis takes precedence in the engineer's mind, relegating the distant future to that never-never land which he will think about 'when he has time.' In the fuel industry crises are so numerous nowadays that, beyond strange dreams of new plant, better coal, and less red tape, the engineer is forced to concern himself wholly with the demands of the present. It is left to the research worker to speculate on things to come and to those bodies whose eyes are focussed on a distant goal. Such a man is Dr. J. Bronowski, Director of the Central Research Establishment of the National Coal Board, and such a body is the National Smoke Abatement Society, whose annual conference was held at Blackpool on September 26-28. Of the many addresses given to this large gathering of believers in the possibility of clean cities, that by Dr. Bronowski stands out as the most far-seeing and at the same time the most human in its assessment of our difficulties and the means by which they may be overcome. In an attack on outdated methods of fuel usage, he referred to our British loyalty to the things which have served us well in the past, but which are now past it. 'This country', he said, 'has a number of endearing and a number of maddening habits. I count among both a certain strain of Emett and Heath Robinson which inclines us to treat any elderly piece of equipment much like a pensioned gun-dog which it would be disgraceful to grudge feed and house-room. I hope that we shall always be able to afford the dog, but I will not hear a word in favour of antediluvian machines; and least of all do they seem to me lovable because they smoke as fiercely as their owners. The owner may not afford a new machine; the nation cannot afford an old one.'

Dr. Bronowski pointed out that although the prophets have long warned us of the fearful day when the world resources of energy would run out, oil in tens of years and coal in hundreds, this was unlikely to happen; the world's energy was safe so long as it had man's inventiveness at its command. Our use of coal and even of oil was by no means running away with the earth's stock, and our use of water was only a few per cent. of that resource which in Europe alone offered us 75 mill. horse power; and this was a renewable resource. He referred to the dozen more remote but wholly practical sources of energy, including the heat of the earth (long used by power engineers in volcanic Tuscany), differences of temperature in coastal waters, wind and tides, etc. In Britain, he believed, we should certainly need atomic energy to solve our 'harder and more pressing problem', and he hoped that we should have an experimental power station running on plutonium within ten years, and a 'massive use' of atomic fuels within 25. Coming to immediate lines of attack, Dr. Bronowski had a great deal to say about smoke which he rightly described as 'a great head of energy'. Smoke, he maintained, was the energy which we wasted, day in and day out. It was the 20 cwt. of energy which was there, ideally, in every ton of coal, and the 17 of these ideal cwt. which were thrown away. It was the smoke up the chimney and the soot on the boiler, the steam that went to waste in the cooling towers, and the smell round the gasworks, and a million inefficient appliances in very factory and home.

The author's remarks, although wide in scope and presented with a light touch, justified their title, 'Power and Waste in their Social Setting', and his comment on domestic appliances received strong support from Dame Vera Laughton Mathews in her Presidential Address. 'The gas industry', she said, 'realises its responsibilities to the domestic consumers who are now installing modern solid fuel appliances, and plans to make, progressively each year, more coke available for the domestic market.' Although coke had to be marketed as the Ministry of Fuel and Power dictated, and the domestic market at present had the last call on supplies, looking to the future it appeared that it should have the first, in order that the recommendations of the Simon Report in regard to space heating by smokeless solid fuel might be implemented. She suggested that these recommendations of the report would be greatly helped if the National Coal Board would adopt a policy of supplying coal at a cheaper rate to the carbonising industries producing smokeless fuel, and making those domestic consumers who insisted on burning coal in the raw state pay extra for their hobby. Here is yet another example of the circle of disapproval which, day by day, tightens around the user of the open coal grate. It will be recalled that during the presentation of his recent paper on the Pimlico district heating scheme, Mr. A. E. Margolis, in answer to a speaker who defended the open fire, said: 'A coal fire is a nuisance to your neighbour. So is your dog, and you buy a licence for that.' But the coal fire lover will only be deprived of an arguable case when he can be offered an alternative means of heating his room which is cheaper, more efficient, and more reliable. When power cuts are no more, when gas fires are cheaper to install, and when coke supplies are reliable and of a guaranteed quality—then only will the dreams of Dame Vera, Dr. Bronowski, and all the other smoke abaters come true. In the meantime the Society is doing excellent work and spreading the gospel in a thousand different ways; and by the variety of its speakers at this latest conference (they came from the coal, gas, electricity, iron and steel, steam engineering, and cement industries), it shows that its approach is wide in scope and expert in quality.

GAS AT THE DAIRY SHOW

On a later page to-day we review the Gas Council's display at the 65th Annual Dairy Show at Olympia. It may be said that the gas exhibit has now 'found its feet' at this important agricultural event. As a newcomer to the Show last year it was perhaps inevitable that the stand should be tucked away in a most unfavourable site. It is therefore a matter for no little gratification that in only its second appearance it has jumped into a position of some prominence at the head of one of the main aisles near the entrance to the Grand Hall. But it is not in position alone that the Gas Council display has advanced. Its design has also been considerably improved. For long we have advocated in connection with these shows a stand design more in keeping with the equipment displayed. It has been a tradition among display men in the gas industry to show appliances in as natural surroundings as possible. We do not see water heaters in living rooms or cookers in bedroom settings. Why then have our display experts apparently been happy to show pasteurisers, sterilisers and so forth against a background so little resembling a dairy?

This year the Gas Council got a bit nearer the objective. The effect was achieved by the skilful use of fibrous plaster moulded to represent whitewashed brickwork. We hope the idea thus born at Olympia will be nurtured and improved until we get really close to the real thing. In our comments on the display we have ventured certain other small criticisms which we hope may be helpful in the design of future gas exhibits at agricultural shows. We have visited many of them during the past twelve months, and we have always endeavoured to look at them to some extent through the eyes of the farmer and have expressed our criticisms on that basis. After all, he is the man the display sets out to interest, even though we must not forget his wife.

THIS FREEDOM

Having given first the Eastern Gas Board and later the Eastern Electricity Board the opportunity of canvassing prospective tenants and then invited the same prospective tenants by circular to say which fuel they would prefer, the Borough Council of Beccles has flattered itself that it has given 'freedom of choice' and decided that electricity only shall be installed on an estate of 52 houses about to be developed. When the matter was raised in the Norwich Divisional Committee of the Eastern Gas Consultative Council a Beccles Alderman said the charge for laying a gas supply was £4 per house, whereas the Electricity Board made no charge; 'although this had no bearing on the decision to install electricity only, the

tenants still preferred electricity', he added. .There was no secret about the voting; out of the 52 circularised, 41 chose electricity, seven gas, and four failed to reply. But apparently not a word was said about repeated load shedding and the possibility for some years to come of tenants being left with no means of cooking. Regarding the seven who preferred gas the Chairman of the Consultative Council rightly pointed out that the right to demand a supply was restricted to owners or occupiers of premises within 25 yards of a live main, and that in this instance the distance was much greater. 'We are not interested', said Alderman Turner, 'in competition between gas and electricity, our job being to watch consumer interests'. Serious hardship is likely to be imposed on tenants of new housing estates if a gas supply is not available. Freedom of choice is impossible if only one service is available when an estate is developed and no provision is made for people who wish to change their minds. The Divisional Committee shuddered when the Beccles representative mentioned that his council proposed to erect 150 more houses, and that when the time came the tenants would 'again be given freedom of choice'—probably to tie succeeding tenants for all time to one fuel, the generation of which will be difficult for a long time to come.

Diary

Nov. 1.—North Thames G.C.C.: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Nov. 1.—Midland Juniors: Half day visit to works of Sperryn & Co., Birmingham, 2.30 p.m.

Nov. 1.—Scottish Juniors (Western): Evening visit to Colvilles, Ltd., Clydebridge, Glasgow.

Nov. 2.—London and Southern Juniors: Short Papers. Edgware Road, 6.30 p.m.

Nov. 3.—Scottish Juniors (Western): Smoking Concert, Glasgow.

Nov. 3.—Yorkshire Juniors: 'Some Aspects of Distribution Control as Applied to Interlinked Undertakings,' F. S. Charnley, Deputy Chief Engineer, North Eastern Gas Board. Sheffield.

Nov. 5.—Women's Gas Federation: Executive Committee. Gas Industry House, 1 p.m.

Nov. 5-6.—Women's Gas Federation: Seventh Branch Conference, Gas Industry House, opening 3 p.m., Nov. 5.

Nov. 6.—East Midlands G.C.C.: Town Hall, Chesterfield, 2.30 p.m.

Nov. 6.—South Eastern G.C.C.: Board Headquarters, Katharine Street, Croydon, 2 p.m.

Nov. 6.—Wales (North) Juniors: Visit to works of Sawer and Purves, Ltd., Manchester, leaving Colwyn Bay 9 a.m.

Nov. 7.—Scottish Juniors (Eastern): Visit to Portobello Power Station, Edinburgh.

Nov. 7.—London and Southern Juniors: Visit to Ascot Gas Water Heaters, Ltd., Neasden, 2.15 p.m.

Nov. 9.—Scottish Juniors (Western): 'Gas Meters and Appliances,' by a speaker from George Wilson Gas Meters, Ltd. Royal Technical College, Glasgow.

Nov. 10.—Western Juniors: 'Coke Quality,' R. W. Cameron (Bristol), and visit to Weston-super-Mare gasworks.

Nov. 12.—West Midlands G.C.C.: Room 159, Queens Hotel, New Street Station, Birmingham, 2.30 p.m.

Nov. 13.—Midland Juniors: 'The Use of Producer Gas for Peak Load Outputs,' D. J. Ward. Birmingham. Staff Mess Room, West Midlands Gas Board, Birmingham.

Nov. 14.—Industrial Gas Development Committee: Gas Industry House, 9.30 a.m.

Nov. 14.—London and Southern Juniors: Evening visits to Nevill's Bakery, Acton, or Associated Newspapers, Ltd., Northcliffe House, E.C.4.

Nov. 14.—Institution of Gas Engineers and Coke Oven Managers' Association: Joint Meeting. 'Recent Researches in Carbonisation,' W. Idris Jones, B.SC., PH.D., Director General, Scientific Department, National Coal Board. Waldorf Hotel. Aldwych, 2.45 p.m.

Nov. 14.—Building Trades Exhibition, Olympia (Gas Council Exhibit).

Nov. 14.—Manchester Juniors: 'Effect of Seasonal Temperature Changes on Manchester Gas Consumption,' H. Mainwaring, Manchester Group Distribution Engineer. Visit to Mather & Platt, Ltd., Park Works, Newton Heath.

Nov. 15.—Wales (South) Juniors: 'Design of Gas Mains Within a New Town Centre Reconstruction Scheme,' J. Nutton. Swansea.

Nov. 16.—Institution of Mechanical Engineers: Thomas Hawkesley Lecture, 'Some Fuel and Power Problems,' H. Roxbee Cox, Ph.D., Storey's Gate, S.W.1, 5.30 p.m.

Nov. 19.—Eastern G.C.C.: Connaught Rooms, 2 p.m.

Nov. 20.—London and Southern Section, I.G.E.: 'Selling Gas to Industry,' N. R. Junkison, Deputy Divisional Manager, Headquarters Division, North Thames Gas Board; 17, Grosvenor Crescent, 2.30 p.m.

Personal

Mr. J. E. Price, A.M.I.E.E., who has been with Lancashire Dynamo & Crypto (Mfg.), Ltd., for 36 years, has been elected a Director of Malcolm and Allan (London), Ltd., an associated Lancashire Dynamo company. Mr. Price will continue to operate from the London Office of L.D.C., which he joined originally in 1924 after 12 years at the Company's Trafford Park works where he also served his apprenticeship.

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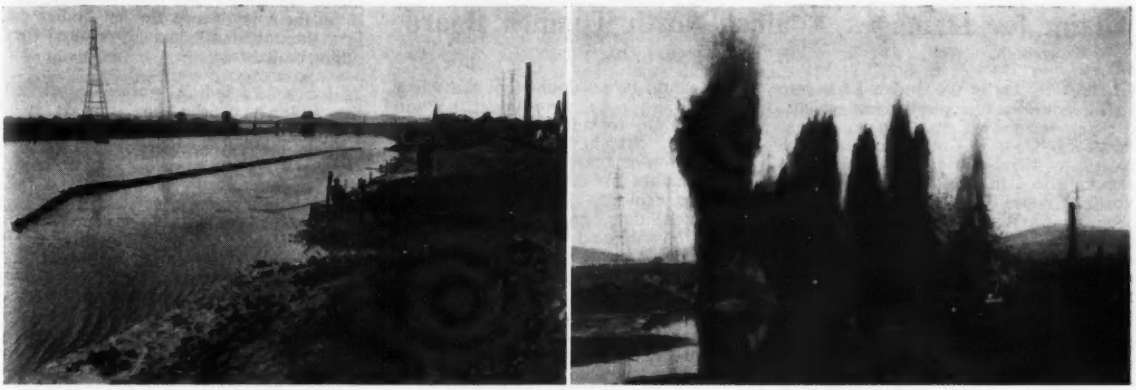
Mrs. D. M. Roy, Deputy Chief Home Service Adviser, Birmingham district, has been appointed Deputy Home Service Adviser at the headquarters of the West Midlands Gas Board. Other recent appointments announced by the Board include **Mr. G. E. Hillman** (Chemical Assistant, Southend-on-Sea, North Thames Gas Board) to the position of Works Chemist, Smethwick district, and **Mr. R. W. Foulds** (Group Engineer, Spenborough and Mirfield, North Eastern Gas Board) to be Engineer, Swan Village works, Birmingham district.

Obituary

Mr. E. W. Walker, Director and Secretary of Gibbons (Dudley), Ltd., and Gibbons Bros., Ltd., died on October 9, aged 60. He joined Gibbons Bros., Ltd., in 1907. In the 1914-1918 war he went overseas with a Worcestershire Territorial Battalion, serving on the western front and later receiving a commission. On returning to the Company in 1919 he joined the accounts staff, becoming Chief Accountant, a position which in 1943 he combined with the office of Assistant Secretary. In the second world war he commanded the Gibbons contingent of the Home Guard, holding the rank of Major. On the retirement of Mr. H. V. Stanton in April, 1946, Mr. Walker was appointed Secretary of Gibbons (Dudley), Ltd., and Gibbons Bros., Ltd. In April, 1948, he was elected to the Board and continued to hold the combined office of Director and Secretary of the two Companies until his death.

GAS MAIN UNDER RIVER NEATH



The above photographs illustrate two phases in the unique operation (described in the 'Journal' for October 17, page 152) of laying a gas main under the river at Neath (Glam.). On the left the prefabricated pipe is seen being floated downstream out of danger of the explosion, which is shown on the right. The only damage caused by this not inconsiderable detonation was a cracked window in one of the cars parked near the site.

GAS WORKERS LEAVING FOR FACTORIES

THE West Midlands Gas Board attributes to shift work and unavoidable dirty conditions a shortage of 400 workers in gasworks at Birmingham, Coventry, Stoke-on-Trent, Wolverhampton, Dudley, Smethwick, Tipton and other industrial centres. Most of the plants are about to change over to full production for the winter, and it is feared that shifts will be under-manned in a number of places.

An official of the Board said: 'It is a difficult position. Output is hampered because we cannot go all out.' Another official said: 'We have not the slightest idea where we are going to get more men. Skilled men who can earn £8 a week in a gasworks can go to a car factory and earn between £14 and £15.'

The main shortage is of stokers and labourers who have been attracted to cleaner working conditions and better hours in factories. Under the Gas Board shift system tradesmen must work on six of every seven Sundays.

It is understood that the Ministry of Labour and Ministry of Fuel and Power are considering whether to resuscitate the war-time labour supply committee, which worked while the Control of Engagement Order was in force.

At Smethwick, there are 25 vacancies and the position is described as acute and is expected to get worse when additions to the existing plant come into operation. In July, August and September, 41 men left the works and 38 came in.

New Look for B.I.F.

The war-time utility frontage of the British Industries Fair heavy engineering section at Castle Bromwich, Birmingham, is to be scrapped and a new permanent facade of imposing design in keeping with the status of one of the largest exhibition buildings in the world is to be erected for the 1952 Fair, to be held from May 5 to 16.

Plans and a model of the new facade have now been passed by the B.I.F. Management Committee of Birmingham Chamber of Commerce and work is to start in the near future. The first step will be to remove the temporary facade consisting mainly of war materials—tubular scaffolding and ex-R.A.F. camouflage netting built up with fluted asbestos sheet and a generous supply of bunting. The frontage will use material not licensed or subject to permit.

Approval has been given by the Government departments concerned to make use of brick and a little stone together with sufficient decorative features to display the building's functions.

Worthwhile Case for Gas

Four interesting features and an open type stand, designed by the Board's publicity section, attracted the public to the Birmingham district (West Midlands Gas Board) stand at the Birmingham Ideal Home Exhibition. Special show models were the Radiation 3518 range and the Raymond cooker with, fore and aft, Ascot moving letters jig-jogging their theme of instant endless hot water, and the Parkinson Renown Mark IV opening and shutting its cover top and drop door. In addition to these appliances, the display included fires, cookers, laundry appliances and a hot water section.

The need for fuel economy limited the number of live appliances and on the neighbouring coke stand the whole focus was on fuel saving, especially the use of controlled burning fires. However, even a rearguard action can attack, and two slogans: 'Modern Gas Cookers Combine Efficiency With Economy' and 'With Gas—Just Sufficient Is Still Efficient,' put a worthwhile case for gas.

Newcastle Consumers Increase

When members of the Newcastle Division Consumer Committee visited the Northern Gas Board workshops at Newcastle on October 16, they were informed by Mr. J. E. White, General Manager that since the end of the war the division has added approximately 4,000 consumers a year. The number of consumers now served totalled 277,858, of whom 110,852 were ordinary and 167,006 prepayment, and they were supplied by 2,000 miles of main. An average of 40 miles of main a year had been laid since the end of the war.

There are on the district as the property of the Northern Gas Board 209,321 cookers and cooking appliances; 46,436 fires and radiators, 3,627 water heaters and 11,298 wash boilers. In addition the estimated numbers of appliances on the district which are privately owned by consumers are 45,000 cookers and cooking appliances, 94,000 fires and radiators, 12,500 water heaters and 175,000 wash boilers and washers. Apart from these there are several thousands of smaller gas consuming appliances.

Following the inspection members were entertained at lunch at the invitation of the Northern Gas Board and were addressed by Mr. E. Crowther, Chairman of the Board, who said that as a result of the visit the committee might have ideas and suggestions which would help the Board to do its work to the best possible advantage for the benefit of the public as a whole.

Alderman A. A. Rennie (Chairman) replied on behalf of the Committee.

New Tar Acid Refinery.—Monsanto Chemicals, Ltd., and Midland Tar Distillers, Ltd., jointly announce that a tar acid refinery is in course of erection at the new works of Midland Tar Distillers, Ltd., at Four Ashes, near Wolverhampton. In due course, the crude tar acids produced will be refined at the new plant instead of at Ruabon.

Liability for 'Inferior' Coke

Claim for Damages Against North Thames Board

DESCRIBED by the Judge as a case of considerable public importance, a claim was heard on October 19 at Brentford County Court for damage caused by the 'spitting' of shale from a coke fire. In the first instance the North Thames Gas Board sued Mr. Leonard A. Watson, of Court Close, Twickenham, for £3 8s. 6d. for gas and coke supplied to him, while Mr. Watson counter-claimed for damage to furnishings.

The Gas Board's claim was for gas supplied to Mr. Watson's business address and the coke to his private address. He denied liability for the gas, saying that it was supplied to a firm of which he was a director at one time. He signed the contract with the Gas Board, but had informed officials verbally when the company became liable. The firm no longer existed. Judge Tudor Rees found that no proper notice of any change had been given to the Board, and gave judgment for the Board for £3 8s. 6d.

The counter-claim represented £30 for a burnt carpet and £5 for a damaged easy chair. Mr. Watson said that the coke, which formed the subject of the Board's claim, was of inferior quality. It contained shale, so that the fires in which it was burnt continually spat.

On March 8 his son lit the fire and left it for about an hour. When he himself came home the room was full of smoke. Upon moving the armchair he found the under part burnt and the carpet under the chair was scorched. He produced ashes, with bits of hard material which he alleged was slag or shale from the coke. He said the bits were warm when he picked them up.

No Guard

The son who lit the fire, Mr. Kenneth Watson, corroborated his father's evidence. Questioned by Judge Tudor Rees, he admitted that no fire guard was used.

Judge Tudor Rees: There is no warranty under the Sale of Goods Act that coke shall be of a certain quality.

Col. Beecroft (counsel for the Board): No; only that it shall be of reasonable quality. If your Honour found it was unreasonable for there to be any shale at all, then we should be unable to supply any more coke.

Judge: What relief has the ordinary householder got against bad results from using inferior coal or coke?

Col. Beecroft: It all depends on what you mean by inferior. It is not abnormal to find shale in coke. The coke manufacturer has to take his coal as he finds it. If there is shale in the coal there will be shale in the coke. Shale is in seams with coal. We might be liable for a foreign body in coke, but shale is not in that category. It is a natural product.

Dismissing the counter-claim, with costs, Judge Tudor Rees said this case was of considerable public importance. There could be no doubt that the sellers of coal and coke were under no sort of obligation to subject every piece of coke and coal they sold to chemical examination or analysis in order to ascertain whether it contained ingredients likely to explode. Indeed, if there was any such duty imposed upon them, those who sold coal would find it a most unreasonable burden and one which they would find it quite impossible to discharge.

There was, however, an implied warranty that the article was of merchantable quality, and that it was reasonably fit for the purpose for which it was intended. It was the duty of those supplying coal to take reasonable care to prevent foreign bodies from getting mixed up with either coal or coke, and if by their negligence foreign bodies got into the coke and damage resulted they might be liable.

'I can take judicial notice,' concluded the Judge, 'of the fact that it is a common practice among householders to provide themselves with fireguards, because when they leave a room or house with an open fire burning there is a risk of something being shot out of the fire and causing damage. Such a precaution is taken irrespective of the quality of the coal or coke. If people, aware of the risk inherent in burning coal or coke on an open fire, take that risk and something happens, they should not look for redress to those who supply the coal.'

Mr. Watson gave notice of appeal.

NATIONAL FIRST AID TROPHY

A TEAM from Liverpool, representing the North Western Gas Board, won the national first aid competition for the gas industry at the Bishopsgate Institute, London on October 22. South Eastern, with a team from London suburbs, was second and West Midlands (Birmingham) third.

This is the gas industry's first entry in the competition, which will be fought out on November 20 when Liverpool will represent it in meeting teams from the police, railways, Post Office, Ministry of Supply, Electricity Authority and National Coal Board for the Trophy offered by the Grand Prior of the Order of St. John.

The test consisted of individual performances and a team test. The latter involved treatment of a patient with whom the team had come into contact on their way home from practice. This was performed before an enthusiastic public.

All the gas boards, except Scottish and Wales, entered teams whom the Judge Dr. Selby, congratulated for their enthusiasm in a difficult task to which they were quite new.

Liverpool won a special trophy presented by St. John Ambulance Association and each member received a silver-gilt plaque. Plaques in electroplate and bronze were presented to the second and third teams respectively while the other competitors had oxidised plaques.

These were presented by Colonel Harold C. Smith, O.B.E., D.L., J.P., Deputy Chairman of the Gas Council.

The Challenge Shield being presented by Colonel Harold C. Smith, Deputy Chairman of the Gas Council, to the winning team. The captain, J. A. Clague, is seen receiving the shield from Colonel Smith, followed by R. Wood, J. Bowness and A. Green. The team represents the Liverpool group of the North Western Gas Board.

Colonel Smith congratulated everyone on the performance they had put up. He pointed out that while there was a large gathering present, there had been a lot of voluntary first aid work in the eliminating rounds.

The Liverpool team comprised J. A. Clague (Captain) (slot supervisor); R. Woods (chief storeman); G. A. Bowness (purifying gas supervisor); A. Green (engine room attendant); and T. E. Taylor (draughtsman).

Coin Collection Economiser

WHILE quarterly collections of money from prepayment meters are practicable in the case of single or dual silver coin meters, they are not possible with copper coin meters, and rarely are they practicable with dual silver and copper coin meters, for consumers tend to use a large preponderance of copper coins in shilling-penny optional attachments, with the result that the cash box becomes full at unduly frequent intervals.

Having regard to the reactions of some gas consumers' councils to the abolition of the copper coin meter, Geo. Wilson Gas Meters, Ltd., have constructed an attachment which will enable quarterly collection to be operated and yet at the same time allow the consumer to use both copper and silver coins in the meter. This device has been designed to operate on the shilling-penny dual coin meter. It enables the consumer to insert a shilling coin at any time, but permits the use of pennies only up to 10 consecutive coins, after which a shilling must be inserted before further coins can be used. This arrangement, the makers believe, meets the objection of consumers who contend that at times they only have coppers. It also enables the coin box in practice to hold a minimum of £4 16s. even under the most extreme conditions when 10 copper coins are put in to every shilling inserted. The accompanying table shows the capacity of the cash box with varying proportions of shillings to pence.

Proportion of Coins	Maximum Capacity of Cash Box (by practical test)	Corresponding Value if only Pennies were used
	£ s.	
10 coppers to every shilling	4 16	
9 " " " "	5 1	
8 " " " "	5 11	
7 " " " "	5 17	
6 " " " "	6 10	
5 " " " "	7 7	£2 5s.
4 " " " "	8 12	
3 " " " "	10 15	
2 " " " "	15 0	
1 " " " "	27 15	
All shillings	40 0	

A Simple Device

It is felt that this simple device could enable the industry to effect a substantial reduction in the cost of coin collection from prepayment meters. The attachment, or one working on the same principles, should, it is suggested, lend itself readily to adaptation to prepayment meters of make other than that of George Wilson.

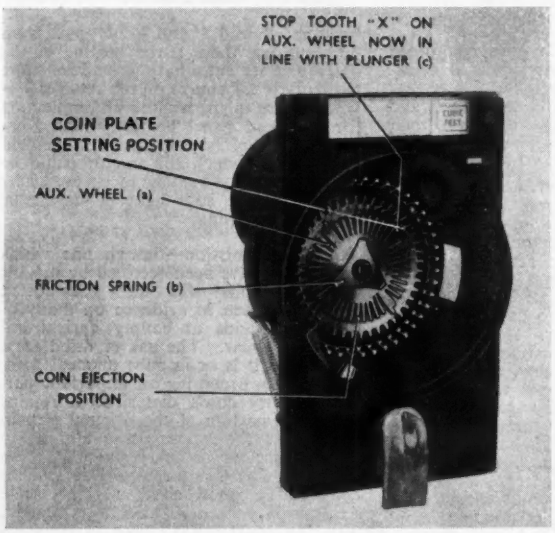
The mechanism of the penny-shilling attachment consists of an auxiliary wheel (*a*) mounted coaxially with the penny coin wheel but free to revolve separately from the latter under the loading of a light friction spring (*b*) (see accompanying illustrations). This auxiliary wheel is operated by a stop plunger fixed to the coin pocket. The wheel (*a*) has the same number of teeth as the penny coin wheel, though four of the spaces between teeth are limited in depth and constitute the penny coin stop positions marked 'X.'

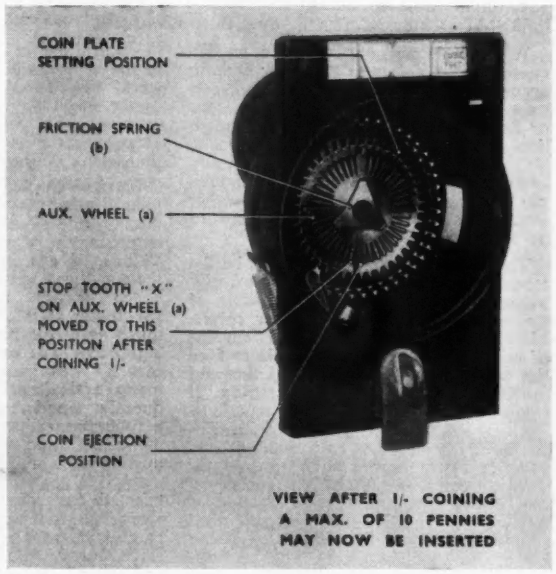
When pennies are inserted the wheel *a* is indexed by the plunger in such a way that 10 coins may be inserted, after which a 'stop tooth' comes into position thus preventing the insertion of any further pennies until a shilling coin has been inserted. After use of the latter coin a further 10 pennies may be inserted and so on. Any number of intermediate shillings may be used and after inserting every shilling the wheel *a* is indexed to a position where a further 10 successive pennies may be utilised.

The design is such that the foregoing will apply to all setting of the coin plate except 11, 22, and 33 cu.ft. per 1d., but in the unlikely event of undertakings requiring these particular settings special arrangements could be made to accommodate them.

The use of this mechanism ensures that at least one shilling must be used to every 10 pennies, and thus the cash box will hold a minimum of £4 16s. worth of coin. And it follows that coin collection becomes necessary only over much longer periods, saving both manpower and expense.

The attachment is simple, and free from trouble.

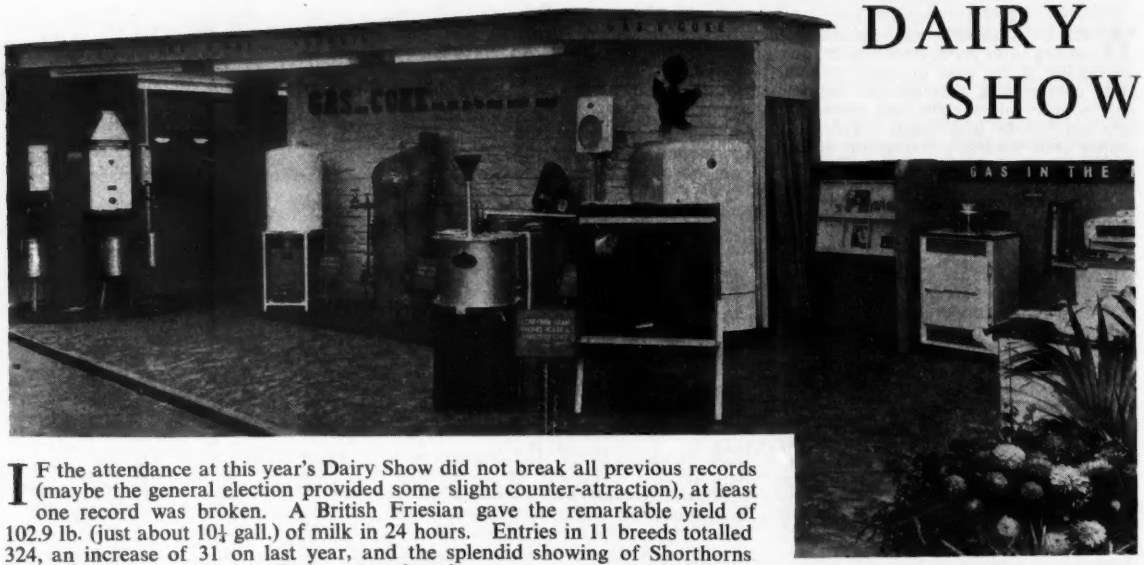

STOP TOOTH "X" ON AUX. WHEEL NOW IN LINE WITH PLUNGER (c)
COIN PLATE SETTING POSITION
AUX. WHEEL (a)
FRICTION SPRING (b)
COIN EJECTION POSITION


COIN PLATE SETTING POSITION
FRICTION SPRING (b)
AUX. WHEEL (a)
STOP TOOTH "X" ON AUX. WHEEL (a) MOVED TO THIS POSITION AFTER COINING 1/-
COIN EJECTION POSITION
VIEW AFTER 1/- COINING A MAX. OF 10 PENNIES MAY NOW BE INSERTED

View after the tenth penny has been coined. A shilling must be inserted before any further pennies.

Gifts to Leeds University.—Gifts acknowledged by the Council of the University of Leeds include £1,000 from the North Eastern Division of the National Coal Board for the Department of Mining; a grant for three years to finance a Fellowship in Mining in memory of the late Lieut.-Col. Hugh Wood, a former student of the University; and £52 10s. a year from 1952 from the Power Gas Corporation for the Department of Coal Gas and Fuel Industries.

GAS COMES TO THE FORE at the 1951 DAIRY SHOW



IF the attendance at this year's Dairy Show did not break all previous records (maybe the general election provided some slight counter-attraction), at least one record was broken. A British Friesian gave the remarkable yield of 102.9 lb. (just about 10¼ gall.) of milk in 24 hours. Entries in 11 breeds totalled 324, an increase of 31 on last year, and the splendid showing of Shorthorns indicated greater interest in dual purpose breeds.

While it is not our province to discuss here the points of the dairy cow, to argue the case for stripping, or to digress upon the rival claims of milking parlour or fixed bail, it is not irrelevant to mention this important fact—namely, although milk production in this country is 40% above pre-war, it is barely enough for our *liquid* requirements. In other words, not many gallons stand between us and another milk shortage.

The reason may to some extent be the recent switching of emphasis from milk to beef, encouraged by the transfer of the subsidy from heifer to steer calves. More likely, perhaps, is the abandonment of milk by many farmers unable to face the steeply rising costs of labour and feedingstuffs. Whatever the reason, it seems clear that milk must remain a 'first priority' among British industries —and, consequently, any direction in which the producer can be assisted towards greater efficiency and economy must be of vital importance. Here, then, we see the gas industry's contribution and the object of its participation in the Dairy Show and in all the other agricultural and allied shows which have found mention in these columns.

Better Site

At this year's Dairy Show at Olympia (October 23-26) we were glad to find that the Gas Council's stand had emerged from the very unfavourable position it occupied last year to an excellent site close to the main entrance of the Grand Hall. Moreover, the stand as a whole was of greatly improved design. We have on a number of occasions in the course of our reviews of gas stands at this kind of show strongly advocated a design more in keeping with the situation in which the majority of the appliances displayed might be expected to operate. If the design of the Gas Council stand at this show did not faithfully reproduce the dairy it certainly went some way towards it. This was achieved by the skilful use of fibrous plaster moulded in the semblance of whitewashed brickwork. Further 'atmosphere' was lent to the stand by the milking buckets and wooden stools—even though their arrangement was perhaps more artistic than strictly functional!

Inevitably, the appliances laid emphasis rather on the retail than the production side of dairying; but this is hardly surprising in view of the wider applications of gas in the former. Nevertheless, there were steam raising boilers, water heaters, and sterilisers—all of which are of interest to the producer as much as to the retailer. Heat treatment equipment was exhibited for those concerned with pasteurising. In visiting many agricultural shows we have frequently wondered why gas appliance manufacturers have not entered the field of milk cooling, which is so important a part of milk production. Admittedly, on many farms this process is simply effected by a flow of cold water. But there is a growing demand for 'artificial' coolers in which full churns can be stored at a safe temperature pending collection. If electricity can provide such equipment, why not gas?

The domestic side was adequately treated without being overdone. Too often at such shows the domestic appliances outnumber and outshine the agricultural; but at Olympia there was a nice balance—with sink unit and white enamelled cooker, water heater, wash boiler and refrigerator comprising the sum total for gas, but supported on the coke side by an 'Aga'—a type of appliance which is becoming increasingly popular in the farmhouse kitchen (where gas is not available, of course!).

There was to our mind one very curious omission from the equipment on the stand. There was not the slightest hint or suggestion that gas has any place in the space heating field. We are not advocating the fitting of gas fires in the cowhouse. (This would be 'feather bedding' indeed!) But quite apart from domestic use there is the heating of the dairy and its subsidiary premises—more particularly, of course, on the retail side—where there might well be an application for overhead panel heaters. And what about a panel heater in the implement shed against which the tractor could be parked in frosty weather to ensure easier starting in the cold light of dawn the following morning?

Another omission—though one which could only have been rectified by models or photographs—was the grass drier, which has been in evidence on many of the gas stands at county agricultural shows this year. The use of dried grass —either as it is or in cube or meal form —is rapidly becoming an important part of the dairy cow's diet since it retains a high proportion of the original protein content of the grass. In addition to photographs of actual installations, we think the Gas Council would do well to construct a good sized working scale model of a grass drier (and a grain drier, too, for that matter) for circulation around such shows as this where an operating installation is impracticable.

An Important Booklet

The Gas Council's booklet 'Gas on the Farm' was available on the stand (though not very prominently displayed). This is a useful and very important little booklet—so far as it goes. But why, as regards size, printing and general production, does it lag so far behind the standard of other Gas Council publications—such, for example, as the Commercial Uses of Gas series? Maybe it is the Council's intention to include 'Gas on the Farm' in bigger and better form in this series. If so, surely the use of gas in one of Britain's major industries should have come much earlier in the series.

In conclusion, we may say that the gas exhibit at the 1951 Dairy Show repre-

sented a notable advance on last year's effort both as regards position and design, though we feel it can go still further in the latter direction. It was 'manned' by members of the sales staffs of the Eastern, North Thames, and South Eastern Gas Boards; and we were told that the number of enquiries received was very encouraging. We hope the gas industry as a whole will press on by this and every other means in extending its service to the farm and the countryside generally, where a worthwhile load undoubtedly awaits it.

W.G.F. Course for Housecraft Teachers

A special one day course for teachers on the use of gas for domestic purposes was arranged by the Women's Gas Federation for Birmingham housecraft teachers and took place in the lecture room of the Domestic Science Central College of Technology. Miss Mann, the housecraft organiser for Birmingham, arranged for all the teachers to be away from their schools in order to attend.

The course opened with a lecture on 'What Happens When Gas Burns' and a working model of a gasworks showed all the stages in the production of gas and its by-products from the raw coal to the burning gas flame. This was followed by lectures on space heating, refrigeration, cookers, and domestic water heating. Judging by the questions following each lecture, the teachers were able to obtain much useful information to pass on to their pupils.

The lecturers came from the West Midlands Gas Board and the Women's Gas Federation.

B.G.S.A. Dinner at Newport

MR. W. E. WEBB, J.P. (Chairman of the British Gas Staff Association and of the National Joint Council for Gas Staffs), Mr. F. C. Henfrey-Smith (General Secretary), and Mr. I. C. Merrifield (National Council member for Wales) were the guests of honour at the first annual dinner arranged by the local branch of the B.G.S.A. on October 19 at the Tredegar Hotel, Newport (Mon.). The function, under the chairmanship of Mr. A. H. Stichbury, was well attended by members of the staff of Newport and surrounding undertakings.

Mr. Webb, responding to the toast of 'The B.G.S.A.,' said that the trade unions, especially the B.G.S.A., had a great part to play in the future of the industry. Much had been done since vesting date to increase efficiency, but human relations in a large organisation were the most important item and there was still much to be done to improve the relations between management and employees.

Mr. Henfrey-Smith, supporting Mr. Webb, expressed concern that the new plant at Nant Garw should be operated by the Coal Board which carbonised the coal, purified the gas and retained the profits from the by-products—supplying gas in bulk to the Wales Gas Board for the new grid. He considered that the processing of coal was properly the job of the Gas Board and would deplore any redundancy of gas employees which might arise from the probable closing of gasworks.

Mr. Merrifield spoke of the cordial relations which existed on the Wales Area Joint Council, and also paid tribute to the work of the secretary of the Newport branch.

1,500th Cooker at Northwich

THE Mid-Cheshire group of the North Western Board recently entertained the chairman and members of the Northwich R.D.C. to celebrate the fixing of the 1,500th cooker and boiler and 1,000th coke grate in houses in the council's area.

Since the end of World War II, the R.D.C. has erected 1,911 new houses—a national record for rural authorities. No less than 1,885 of these to date have been equipped with a gas cooker and boiler since 1946. Later, two coke grates were standard installations in each house.

To meet the demands of the council's various housing projects, the Mid-Cheshire group has up to the present laid some 28 miles of main and more than eight miles of service pipe to bring gas to 1,684 houses. Appliances fixed now include 1,585 cookers, 1,585 boilers, 1,200 coke grates and 1,684 meters. The Mid-Cheshire group's sales and service and distribution staffs have often been commended by the R.D.C. for their willing co-operation in the council's drive to house new tenants; gas supply, materials and appliances have always been made available.

At the informal celebration at Northwich, attended by Mr. Harry Butters (Board Member) and Mr. J. W. Rodgers (Sales and Service Officer), Mid-Cheshire officials entertained Councillor H. Grimsditch, J.P. (Chairman of the Northwich R.D.C.), Councillor H. Bradbury, M.B.E. (Chairman of Housing), and members of the Rural District Council.

GENERAL GAS APPLIANCES STAFF DINNER

Photograph taken at the annual staff dinner and dance of General Gas Appliances, Ltd., held at the Grand Hotel, Manchester, on September 29. At the top table can be seen Mr. H. C. Wilson Bennetts, Chairman and Managing Director, Mr. H. Hilson Wightman, Director and Secretary, Dr. D. Greig, Executive Manager, and Mr. A. W. Eustace, Commercial and Sales Manager. The Chairman, reviewing the work of the Company, stated that tremendous strides had been made since the end of the war, and he mentioned in particular the introduction of the 'Junior General' and 'Raymond' cookers which had made a great impression in the gas industry.

The Chelmsford Verticals

In a natmosphere charged with the later excitement of the General Election a large party of visitors, including the Mayor and Borough Treasurer, last Friday inspected the magnificent new carbonising plant at Chelmsford. The visit was by invitation of the Chairman of the Eastern Gas Board, Sir John W. Stephenson, C.B.E., J.P., and he was accompanied by Mr. W. J. Collins Garrard (General Manager, Ipswich Division), Mr. F. N. Howes (Group Manager, Chelmsford), Mr. Frank Allen (Group Manager, Clacton and Colchester), and Mr. T. C. Battersby (General Manager, Watford Division). Mr. T. Campbell Finlayson (Chairman of the Woodall-Duckham Company, the main contractors) was also present.

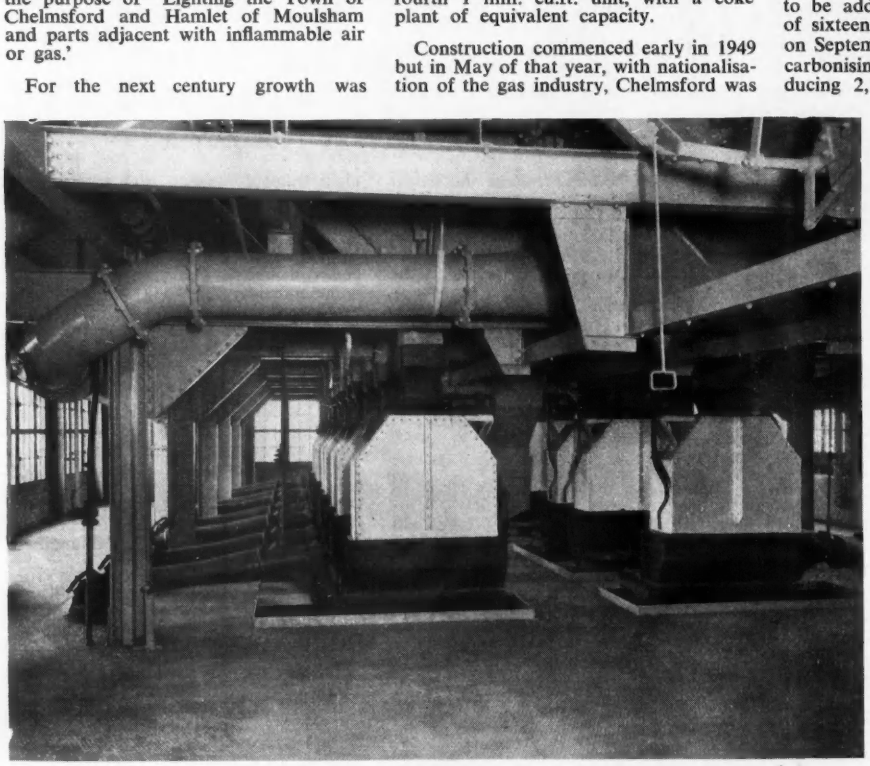
GAS was first made in Chelmsford following the formation in 1819 of the Chelmsford Gas Light and Coke Company with a capital of £5,000 for the purpose of 'Lighting the Town of Chelmsford and Hamlet of Moulsham and parts adjacent with inflammable air or gas.'

For the next century growth was steady, and in 1918, when the undertaking was acquired by the Chelmsford Corporation, the annual make of gas was just over 100 mill. cu.ft. In 1926 horizontal retort plant was erected, additional retorts and a coke plant being added in 1932.

With the growth of the town and its surroundings progress was continuous, and ancillary plant was added year by year. During the war, expansion was even more rapid and it became evident that reconstruction on a much larger scale would be necessary. More land was purchased in 1942 increasing the area to thirty acres and in 1945 the Council decided to obtain tenders for a new vertical retort house and coke grading plant. Approval of the Ministry of Fuel and Power was obtained, but in 1946 the Ministry asked that consideration should be given to supplying gas from Chelmsford to several neighbouring undertakings whose plant required re-construction. The whole scheme was re-cast and an order placed for a 2 mill. cu.ft. per day retort house with provision for adding in the building a third and, if necessary, a fourth 1 mill. cu.ft. unit, with a coke plant of equivalent capacity.

Construction commenced early in 1949 but in May of that year, with nationalisation of the gas industry, Chelmsford was grouped with the Ipswich Division of the Eastern Gas Board. The new Board confirmed the addition of the third unit and placed an order for the coke installation in order that Chelmsford, together with the reconstructed Colchester station should become the main manufacturing units for the Board's Essex bulk supply scheme. New gasholders have already been erected by the Board at Braintree and Witham, and high pressure mains laid from Colchester to these towns. Mains from Chelmsford to Witham are now being laid with extensions to Heybridge and Maldon to follow. The layout is shown on the plan. Gas will be supplied from Chelmsford into the new grid by the end of 1951, the amount being gradually increased as additional purification and subsidiary plant now on order is installed on the Chelmsford site.

The new installation consists of twenty-four latest type lambent heated Woodall-Duckham continuous vertical retorts arranged in two benches—one of sixteen retorts and the other of eight retorts—all contained in a retort house large enough for a further eight retorts to be added in the future. The bench of sixteen retorts commenced gasmaking on September 7, 1951, and is capable of carbonising 128 tons of coal and of producing 2,187,000 cu.ft. of gas per day. The bench of eight retorts is completed ready for operation and, when put to work, will increase the carbonising and gasmaking capacity by 50%. When the additional eight retorts are built the total carbonising capacity will be 256 tons of coal from which over 4 mill. cu.ft. of gas will be produced.



The top charging platform snowing the auxiliary coal hoppers and liquor sprayed gas offtake pipes. The foul gas main is seen above.

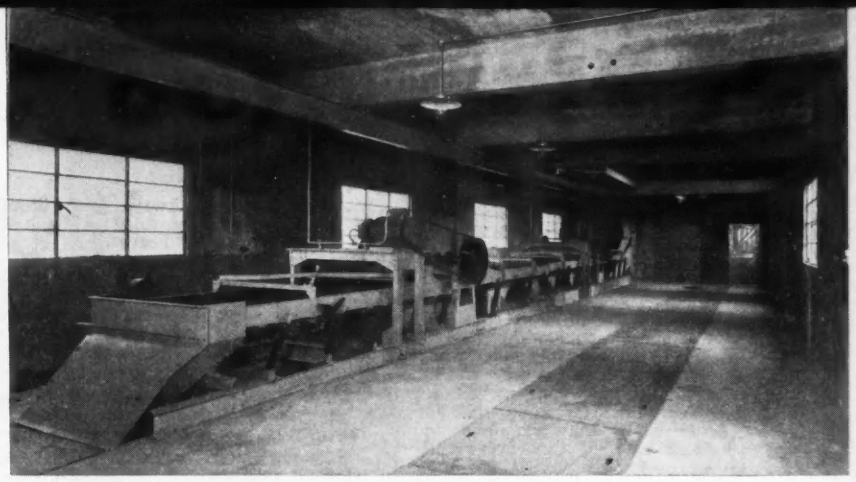
The retorts are about 26 ft. high, rectangular in plan and tapered to allow continuous regular descent of the coal. They are 10 in. wide at the top, 82 in. long and arranged so that any one retort can be controlled without affecting the others. Transverse air-cooled division walls divide each bench into sections of four retorts and any section can be let down cold for repair without interfering with the working of the others.

Coal is fed into auxiliary supply hoppers attached to the retort tops. From these it gravitates into the retorts and is heated and converted into coke during

its passage through them by combustion of producer gas in combustion chambers at each side of the retort. The various gases and by-products are evolved in the appropriate zones of temperature.

The retorts embody the lambent heated system and they are fitted with standard W-D coke extractors and water-sealed dischargers, from which the coke is discharged dry and cool, and with liquor-sprayed gas offtakes. A special feature is the spring-controlled retort bracing incorporating volute springs designed to apply a known pressure to the setting brickwork.

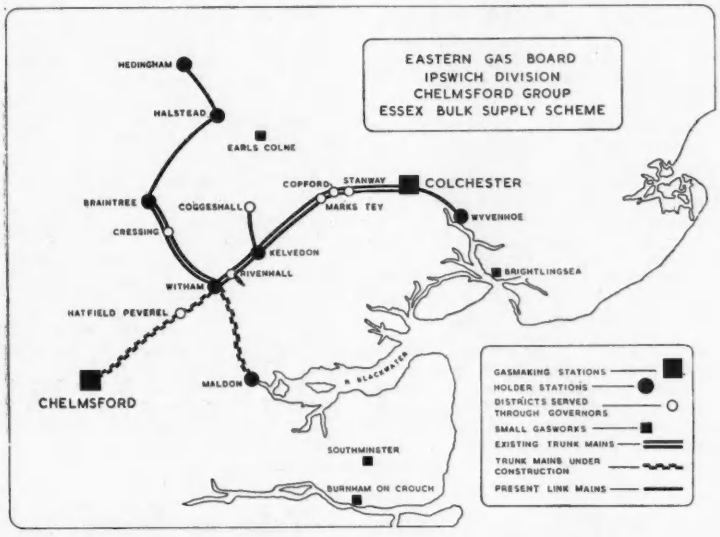
To supply the gas for heating the retorts two batteries of W-D step-grate producers are provided—one of four producers for the bench of sixteen retorts and the other of three producers for the bench of eight retorts. The latter battery has been designed for extension in the future. Any three producers of the larger battery (or of the other battery when extended) are capable of heating sixteen retorts, and any producer may be shut down without interfering with the others. The producers are designed to use a proportion of breeze as fuel if desired.



The interior of the coke grading plant showing the reciprocating screen with the scalping screen above.

Weir direct-acting steam-driven pumps, one acting as standby.

There are two horizontal fire-tube induced-draught waste heat boilers with a working pressure of 120 lb. per sq. in. Each is large enough to deal with the waste gases from a bench of 16 retorts and is provided with a steam-driven induced-draught fan. After meeting all requirements of the present carbonising plant there is available some 4,800 lb. per hour of steam for works use. The Neckar water softening plant is capable of dealing with 1,400 gal. of water per hour.

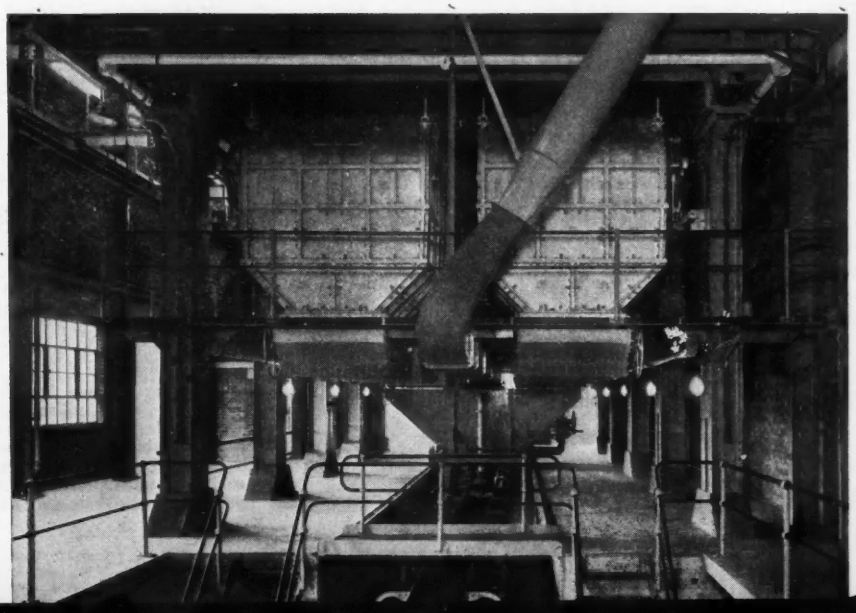


Coal Handling

The coal for the new installation is delivered in road vehicles and discharged into the 30 tons capacity coal receiving hopper adjacent to the retort house. From this hopper the coal is fed by either of two scraper conveyors to a breaker where the large coal is reduced to 3½ in. cube. The small or broken coal is elevated by either of the two gravity bucket conveyors encircling the centre bay of the retort house and delivered, via either of the two systems of 24 in. band conveyors and reversible shuttle band conveyors, into the coal storage hoppers above each bench. From the storage hoppers, which have a capacity of 60 hours, the coal is fed through rotary valves into the auxiliary supply hoppers attached to the top mouthpieces of the retorts. The handling system has a capacity of 80 tons of coal per hour.

A travelling coke shoot receives the coke from the water-sealed dischargers

A view beneath one of the benches showing the coke extractors, hoppers and dischargers, the travelling coke shoot with the band conveyor beneath and the dust extraction duct.



The retort house is, with the exception of the spire of Chelmsford Cathedral, the tallest building in the district and particular care has been taken to ensure that it shall be architecturally pleasing. Brick towers enclose the chimneys and lift and form features of the design. Within the house dust extraction, cold air circulating and vacuum cleaning provide the best possible working conditions for the operatives and there is also a mess-room, locker room and lavatory with showers.

The gas issues from the top of the retorts and passes through liquor-sprayed gas offtake pipes to the foul gas mains which are fitted with Bryan Donkin governors. A common suction main then leads the gas to the new W. C. Holmes condensers.

Ammoniacal liquor is circulated to the sprays on the gas offtakes, collecting mains and foul mains by either of two

and delivers it on to a 30 in. band conveyor running in a trench. There are two such conveyors, one beneath each bench, and they deliver the coke, via rotary fillers, into either of the two gravity bucket conveyors encircling the centre bay. Run-of-retort coke for the producers and for filling the retorts after scurfing is delivered by either conveyor into an overhead producer and retort coke storage hopper of 60 hours producer fuel capacity. From this hopper coke is fed by individual shoots to the producer charging and retort filling skips.

The coke for sale is normally delivered to the coke grading and storage plant by the two G.B. conveyors and 30 in. hand conveyor running in a gantry spanning between the retort house and the screen house.

One of the band conveyors beneath the bench has been extended so that coke reclaimed by Chaseside shovels from stock outside the retort house may be fed into the handling system. The system has a capacity of 40 tons of coke per hour.

The coke grading and storage plant is constructed in concrete and deals with run-of-retort coke at the rate of 40 tons per hour. The coke is fed from the retort house G.B. conveyors to a 30 in. belt conveyor which delivers to a night buffer hopper of 128 tons capacity.

From the night storage hopper the coke is fed to a 12 ft. by 4 ft. Pegson scalping screen, the rate of flow being controlled by a feeder. The scalped coke, over 1¼ in., is passed direct to a bunker compartment via a spiral shoot and the through product is directed to a line of Jenkins balanced reciprocating screens, 4 ft. 4½ in. wide.

The plant is arranged for future duplication of the screens when required.

The bunkers have a total storage capacity of 425 tons, divided up as follows:

100 tons	...	Over 1¼ in.
110 tons	...	2 in. to 1 in.
95 tons	...	1¼ in. to ½ in.
60 tons	...	½ in. to ⅜ in.
60 tons	...	Below ⅜ in.

The cones of the main bunkers and the night storage hopper are lined with hard Blue Staffordshire tiles. All shoots liable to wear are fitted with renewable liners, blue tiles for the large shoots and C.I. or steel plates for the smaller. On one side four outlets have fixed debreezers and can handle bulk loading of road vehicles as well as bag loading via Belle Isle weighers.

On the opposite side a travelling debreezer handles for bag loading only, again via Belle Isle weighers.

Four central shoots are provided for loading undebreezed coke of all grades to road vehicles direct. There is additionally a bulk loading shoot for breeze.

All breeze collected from the debreezing screens is brought to a central gangway and discharged direct to lorries.

The debreezing screens are Pegson's, size 4 ft. by 3 ft. 6 in. The bagging platform is arranged in two tiers to facilitate the loading of sacks into vehicles.

Adequate access to all working levels is provided by stairways, and lifting beams have been provided to facilitate the replacement of heavy parts at all appropriate sections of the plant.

The coal carbonisation plant and the coal and coke handling plants were built by the Woodall-Duckham Vertical Retort and Oven Construction Co. (1920), Ltd., of London.

The coke grading and storage plant was built by W. J. Jenkins and Co., Ltd., of Retford.

Midland Section Autumn Meeting

THE autumn meeting of the Midland Section of the Institution of Gas Engineers was held at the Queen's Hotel, Birmingham, on October 26, under the Chairmanship of Mr. Alexander Tran, Northern Divisional General Manager, Southern Gas Board. Among those who sent apologies for absence were Mr. G. E. Currier, Senior Vice-President, and Dr. W. T. K. Braunholtz, Secretary, of the Institution. Sympathetic reference was made by the Chairman to the death since the last meeting of Mr. W. A. Woosnam (Rothwell). Four new members were welcomed—F. Brinsley (Radiation Ltd.), R. Pollard (R. and J. Dempster, Ltd.), H. Moys (West Midlands Gas Board), and H. Shackleton (Bilston).

Congratulations were extended to Mr. S. K. Hawthorn on gaining the Institution Silver Medal for his paper on 'Making the Best Use of Existing Gas Making Plant and Planning Extensions,' and also to Mr. R. Kimble, Chief Inspector, New Buildings Department, Birmingham, on winning the annual prize of the Midland Junior Gas Association for his paper on 'Organisation and Opportunities in New Building Work.'

The Chairman presented certificates to the successful students from the area in the 1951 examinations of the Institution. There were nine Higher Grade Gas Engineering (Manufacture) and four Higher Grade Gas Engineering (Supply).

Mr. E. B. Craddock, Engineer and General Manager of the Aylesbury group, presented a paper on 'The Development and Administration of a Small Group of Undertakings.' The paper and discussion will be dealt with in a later issue.

In calling on Mr. Craddock to present his paper the Chairman said he was one of the youngest members and was to be congratulated on coming forward at this very early stage in his membership of the Section. When he accepted the invitation he expressed the view that what he had to say about the small group with which he was associated would be of little interest to those in charge of larger undertakings. It would be generally agreed that the large undertakings could learn quite a lot from the operation of the smaller ones, just as the smaller groups learnt from the larger.

A vote of thanks was accorded to Mr. Craddock on the proposition of Mr. J. E. Wakeford, Senior Vice-Chairman, seconded by Mr. W. A. Pask (Leicester).

The Chairman announced that a special meeting of the Section would be held at Birmingham on February 8 for the purpose of discussing one of the papers to be presented at the 1951 autumn research meeting of the Institution. The particular subject had not yet been selected, but it was hoped to arrange for the author to attend in person to deal with the points raised in the course of the discussion.

Live Displays at Dundee Exhibition

A feature of the Scottish Gas Board's stand at 'Dundee's Own Exhibition' (September 26 to October 6) which impressed the public was that every appliance displayed was alive and could be shown in use. The water heaters were fitted upon a realistic rockery, down which water was continually passing. No mains water supply was available, therefore the water supply for the rockery and to each heater was recirculated from the well to the tank by an electric motor.

The public showed a keen interest in the model gasworks, which consisted of scale models of works plant and samples of by-products, particularly stressing the compounds which are derived from tar distillation. The novelty of this display was that the connecting gas mains were represented by glass tubing which passed through the various items of plant.

The head of water thrown by the water storage tank was utilised to operate an air bubble and water flow through this glass tubing. The tubing between each item of plant was coloured differently, each colour representing a particular by-product.

Talks on Meters for East Midlands Staffs

Some little time ago George Wilson Gas Meters, Ltd., received an invitation from the Sheffield and Rotherham division of the East Midlands Gas Board for a member of the firm to give an address on meters on each of four evenings to the sales and service personnel of the Doncaster, Barnsley, Worksop, and Rotherham districts. Naturally this invitation was most cordially accepted, and the firm's Technical Director (Mr. D. C. E. Poole) together with the Northern Area Sales Manager (Mr. R. B. Reynolds) attended the meetings and gave a different talk in each town, dealing with the meter from the earliest days to the most modern developments. Mr. Poole's knowledge is, of course, peculiarly apt in this direction, since he has served the Company for over 40 years, and he was, therefore, able to speak from long practical experience.

The talks were largely designed to assist the personnel of the gas undertakings in their day-to-day duties and to enable them to deal with their own particular problems and with any complaints which might arise on the district in regard to gas meters.

British Roads for British Tar

Colonel H. C. Smith Suggests a Revised Slogan for County Surveyors

THE annual general meeting of the British Road Tar Association on October 23 was followed by the annual dinner at the May Fair Hotel when, as usual, the gas industry was well represented in a large and distinguished gathering reaching a record total of about 230. Colonel H. C. Smith, Deputy Chairman of the Gas Council, made his final appearance as President of the Association, Mr. Stanley Robinson (Midland Tar Distillers, Ltd.) having been elected as his successor earlier in the day. The chief guests were Dr. W. H. Glanville, C.B.E., President of the Institution of Civil Engineers and Director of Road Research, and Mr. S. E. Mehew, O.B.E., County Surveyor for Derbyshire and Chairman of the Pavings Committee of the Road Research Board.

The gas boards were represented by an array of Chairmen and Deputy Chairmen, two at least of whom were playing a dual rôle—Mr. W. K. Hutchison (South Eastern) as Vice-President of the Association, and Mr. J. H. Dyde (Eastern) as President of the Institution of Gas Engineers. Besides them were Mr. Michael Milne-Watson and Mr. F. M. Birks (North Thames), Sir John Stephenson (Eastern), Mr. G. le B. Diamond and Mr. A. W. Lee (West Midlands), Mr. D. P. Welman (North Western), Mr. C. H. Chester (South Western), Mr. S. E. Whitehead (Southern), Mr. G. E. Currier (North Eastern), Mr. D. D. Burns (Scottish), and Mr. Sydney Smith (East Midlands). Mr. R. S. Snelling had hoped to come from Wales, but indisposition prevented him.

Sir Donald Fergusson (Permanent Secretary) and Mr. R. N. Quirk (Under Secretary, Gas Division) came from the Ministry of Fuel and Power, and Dr. W. Idris Jones, Director General of Research, represented the National Coal Board; Dr. E. V. Evans was present as President of the Coal Tar Research Association, and Mr. Leslie O'Connor was there as Chairman of the British Association of Coke Oven Tar Producers. Each of the gas industry's own tar and by-products works was represented as well as the various co-operative tar schemes, and there was a good attendance of gas engineers from all parts of the country.

Durability and Resilience

Mr. W. K. HUTCHISON, proposing the toast of the guests, referred to the regretted absence of the Minister of Fuel and Power and the Parliamentary Secretary of the Ministry of Transport (the General Election was only two days off), but welcomed the numerous permanent civil servants who exhibited in a high degree those qualities of durability and resilience which the Association rated so highly in its finished products. A reminder that their slogan 'British tar for British roads' was not the whole story was to be found in the presence of M. Cochery, President du Syndicat National des Importateurs Français de Goudron de Huille, and M. Coret, Vice-President de Comite Inter Syndical des Goudrons, Benzols et Dervies, and other guests from the Continent. M. Cochery was perhaps better known to many as the head of the great firm of Enterprises Albert Cochery, which had just celebrated its 25th anniversary and which had through most of that period been a consistent and he trusted satisfied user of British tar.

The customer, added Mr. Hutchison, was represented by well over 30 county and borough surveyors in addition to whom he welcomed the heads of allied organisations and all interested in the research activities of the Association.

Dr. W. H. GLANVILLE, President of the Institution of Civil Engineers and Director of Road Research, D.S.I.R., replying, said one of the outstanding and enjoyable features of his work in road research had been the co-operation of his Department with the B.R.T.A., a co-operation based on equal sharing of the costs of their research on tar. From small beginnings the research had spread until there was hardly any firm engaged in the tar business and few road surveyors who were not, or had not, in some way joined in the investigations, which ranged from fundamental work in the laboratory to full scale trials.

A Precision Process

Of recent years two main lines had been followed—one concerned with improvements in the techique of surface dressing, the other an attempt to increase the life of tar surfacings and particularly of open-textured surfacings. The results of that work had changed surface dressing from a chancy process to one of precision. In his view Britain led the world in surface dressing technique, particularly now that the surface dressing contractors had taken the bold step of working to a British Standard for their tar spraying machines and testing them at their own testing stations. The machines were better than anything produced before and were, in his view, in advance of similar machines produced in other countries.

The problem with carpets and surfacings was two-fold, the first to make the best use of road tar as now produced and the second to modify the tar to suit the type of surfacing and conditions of use. In an attempt to find out how best to use existing road tars many road experiments had been made in different parts of the country—'local aggregate experiments' employing limestone in Somerset and Derbyshire, slag in Huntingdon, quartzite gravel in Staffordshire, and flint gravel in Middlesex. Some experimental carpets were over 10 years old, and experiments had led to the issue of recommendations for tar carpets. The problem of adjusting the properties of the tar to suit the type of surfacing was more difficult, but the work had reached the pilot-plant stage and the next step might be to include an oxidation requirement in the British Standard for road tar, the idea being that open-textured surfacings would require binders that had low susceptibility to oxidation, and dense impervious surfacings, on the other hand, would require binders that oxidised and wore under the action of traffic so as to retain a non-slippery surface.

Mr. S. MEHEW, O.B.E., County Surveyor for Derbyshire, Chairman of the Pavings Committee of the Road Research Board, who proposed the toast of the Association, said the question of technical improvement and research occupied a prominent place in the Association's activities and not less than 62% of its total expenditure had been devoted to that end. County and municipal engineers and surveyors were grateful for the many steps which the B.R.T.A. had taken in the direction of technical advice and propaganda resulting from research. The certification of trade marks for tar was a practical and beneficial measure, and they also appreciated the services of the expert travelling representatives and the extreme usefulness of the new loose-leaf manual.

Scarcity of Roads

Colonel H. C. SMITH, responding to the toast, said those who travelled up and down the country must have been appalled at the scarcity of roads in Britain today, and he suggested that some of the guests might form themselves into an association to popularise the idea of 'British roads for British tar' as a change from the older slogan. As this was his last appearance as President of the Association he felt he would be remiss if he did not mention some of the people who did the real work of the Association in addition to those who sat on the various committees. He referred to Mr. Glayzer, Mr. Lee, Mr. Leach, and Mr. Milton, the travelling representatives, whose services were so much appreciated, and who were always 'At your service.'

Tribute was due to Mr. Jackson, the accredited officer under the certification of trade mark scheme, who had been ill for some months but hoped to return to duty in the near future. In his absence Mr. S. W. Wikner, who had retired from the former Newcastle gas undertaking's tar products works, had deputised for him. The Association was under a great debt of gratitude to Mr. W. E. Cone, its technical adviser, and Mr. McCormack, its energetic Secretary who among many other duties was responsible for the arrangements for the dinner. Last but not least he mentioned Mr. J. Davidson Pratt, Chairman of Council, who was a tower of strength and to whom they were grateful for all the work he did on their behalf.

M. COCHERY, in response to an invitation from the President, addressed the gathering in French, expressing appreciation of the warm welcome extended to the Continental visitors and paying tribute to the British road system and the work of the B.R.T.A. He also brought greetings from M. Hondemarcq, Director General of Roads in France.

AMERICAN SPOTLIGHT

Items of Topical Interest from the Contemporary Technical Press of Canada and the United States

GASHOLDER PLAYS MAGPIE

A REMARKABLE photograph was published in the August issue of the *American Gas Journal* showing some of the debris found at the bottom of a gasholder belonging to the Public Service Company of Northern Illinois in a routine inspection after 39 years' service. There was a great variety of tools, thought to have been dropped by workers installing the crown plates when the holder was built, and a kerosene lamp which after being under water for 39 years was lighted easily.

* * *

HUGE HOSPITAL INSTALLATION

THE new Truett Memorial extension to the Baylor Hospital in Dallas makes this institution, with its 850 beds, the largest non-governmental hospital in the area. From the giant steam boilers consuming 6,500 cu.ft. of gas per hour and the glittering kitchens, which require 1,500 cu.ft. per hour, to the small laboratary bunsen burner, gas almost means life itself to this great edifice.

The steam plant has three boilers capable of producing 70,000 lbs. of steam per hour. Two steam turbines drive centrifugal compressors furnishing 1,200 tons of refrigeration to air condition the buildings. The boilers also supply steam to the laundry, which is equal in size to some of the city's largest commercial laundries. The important job of sterilising the many hospital instruments is also done with steam from the main plant, as well as all hot water requirements. Two of the boilers are Babcock & Wilcox.

Thousands of meals a day, many of them calling for special preparation, are cooked by gas. The equipment represents the last world in modern hospital catering in one main and five diet kitchens. (*Gas Age.*)

* * *

NEW HOMES CHOOSE GAS

A RECENT survey made by the American Gas Association revealed that where gas was available to home owners and builders on a free main extension basis more than 95% of the single family and multi-family dwelling units used gas for one or more purposes. The survey covered 565,000 new single family dwellings that were built within gas company areas in 1950. About 90% of these, or 513,000 new dwellings, were entitled to free extension allowances whereby home owners and builders were not required to contribute to the cost of main extensions of gas lines.

More than 95% of these 513,000 dwellings used gas for one or more purposes, with less than 4% going wholly to competitive fuels. Individual uses for gas in this group were: cooking, 86%; water heating, 89%; gas space heating, 87%; and gas refrigeration, about 7%.

Free extension privileges were also available to 138,000 new multi-family dwelling units covered by the survey, and nearly 96% of these used gas for one or more purposes. Individual uses of gas in these dwelling units were: gas cooking, 91%; water heating, nearly 44%; space heating, 41%; and gas refrigeration, about 14%.

Only 10%, or about 76,000 units, of all single family dwellings built in 1950 did not have free extension allowances. Approximately one third of these used gas for one or more purposes. There were about 18,000 new multi-family units that did not have free extension allowances and nearly 65% of these used gas for one or more purposes.

The fact that only one third of the new single family dwellings outside the free extension allowance areas used gas for one or more purposes is causing a number of gas utilities to re-examine their service extension policies. The survey showed that builders or new home owners are reluctant to install gas services if they have to contribute to the cost of main extensions. (*Gas Age.*)

* * *

FIVE-IN-ONE KITCHEN UNIT

OCCUPYING little more than four square feet of floor space an ingenious unit for the small kitchen has been introduced by the General Air Conditioning Corporation, of Los Angeles, which combines an ample refrigerator, large storage drawer, sink, draining board, and gas hotplate.

The main body of the appliance consists of a 4 cu. ft. capacity refrigerator, below which is the commodious storage drawer mounted on silent roller bearings. On top is the 12-in. by 16-in. sink and three burner gas hotplate, the width over both measuring no more than 27½ in. The hotplate cover, when lowered, forms a ready made draining board. The unit does not include an oven. (*Gas Age.*)

* * *

PLUMBERS MUST BE GASFITTERS

EDMONTON'S licensing by-law was changed recently to provide that persons writing city examinations for master plumbers' licences will be required to pass as master gas fitters. Failure to qualify as a master gas fitter means the candidate is not entitled to be certified as a master plumber. Master examinations cannot be written unless the candidate holds provincial proficiency certificates as journeyman plumber, gas or steam fitter. (*Canadian Gas Journal.*)

A.G.A. LABORATORY EXTENSION

FLOOR space at the American Gas Association laboratories in Cleveland has almost doubled with the opening of a new two-storey addition. The new extension marked the third expansion of the Cleveland unit, which has kept step with the continuing increase in the number of gas appliances submitted for tests each year. Since the laboratories were opened 25 years ago as part of the voluntary industry programme of protection for customers, 35,000 models have undergone rigid testing. At present, more than 4,000 units are tested each year. (*Gas Age.*)

* * *

COOKING CLEANLINESS

THE battle against electricity's claims of cooking cleanliness is being carried directly to the public by a portable demonstration unit designed by the Caloric Stove Corporation. The ingenious model is built to show what actually happens in a gas oven. The unit consists of a porcelain enamelled cabinet, 18 in. long, 10 in. deep, 12 in. high vented at the top. A glass window offers a full view of the interior.

For test purposes ordinary incense is burned in a tray beneath the gas burner, the heavy vapours rising through the vent at the top of the unit. When the burner is turned on, the flame immediately consumes the vapours. This action is easily seen from the built-in light at the top of the appliance.

The complete unit can be used to give demonstrations in the home of potential customers, on the sales floor, and at local fairs and exhibits. (*Gas Age.*)

* * *

A TWO-FUEL BURNER

AS an answer to gas service interruptions during periods of extreme demand, the Norman Products Co., of Columbus, Ohio, has produced an industrial-commercial combination gas-oil burner, which switches automatically from gas to oil and back as determined by an outside temperature thermostat or by drops or rises in the gas pressure.

In industrial production heating operations the oil burner can be used for the initial start up of each firing period. When proper stack temperature is reached, the gas valve automatically opens putting positive gas pressure in the gas manifold, breaking the oil burner circuit as soon as gas pressure is established. This assures adequate gas pressure before the gas is ignited.

Seven sizes are available—from 80,000 to 3,000,000 B.Th.U. capacity—both upshot and inshot models. (*Gas Age.*)

The Juniors and New Processes

By L. G. TOWNSEND, M.Sc., F.R.I.C. M.Inst.Gas E.,
Liverpool Undertaking, North Western Gas Board.

This Presidential Address to the Manchester District Junior Association of Gas Engineers discusses the Holmes-Manchester liquid purification plant at Liverpool, which has run continuously for nearly two years. It has provided information which will enable a reliable plant to be devised capable of operating without oxide boxes.

WHILE it will be some years before we can say that we belong to an established nationalised industry, nevertheless, the change-over period with its upsets and uncertainties is now falling behind us. The pattern for the future is becoming more apparent. All idealogical considerations apart, there are few of us who would deny the benefits which are becoming apparent from the integration of the industry. It is doubtful if the large scale interlinkage of undertakings could ever have been achieved by means other than nationalisation. In many directions, the pattern is still incomplete and the position of the junior associations is not yet established. It is imperative that we ourselves appreciate the part we wish to play in this brave new world and should make every effort to achieve it. It is fitting that we should keep our objectives clearly in mind at a time when our future will depend on our achieving them.

Membership of our Association is based on the examinations of the Institution of Gas Engineers; the members are charged with the task of encouraging the younger members to acquire full membership. I believe that in this way we contribute to the education of the junior members something that can be obtained in no other way. Our activities are complementary to the academic studies of the young people entering the profession and any education scheme should appreciate the help that our Association gives. There is ample evidence that the area boards already appreciate our position and in all areas the junior associations have received encouragement. In our own particular area you will recall our Chairman's offer of a new award by the Board for competition in this Association.

It is still regarded by many as inequitable that we should not admit the staff of contracting firms to our organisation while at the same time accepting their special facilities and hospitality on many occasions. I would, however, like to stress that the matter was gone into very fully when our rules were revised in 1947, and I believe that the decision was a sound one. I mention this matter on this occasion because it is probably the only subject on which the junior associations do not reach complete agreement. It says a great deal for the harmonious relations existing between the contracting firms and our association that they accept this state of affairs and respect the principles on which our decision was made. This matter is continually before us, but there is no reason to believe that the general feeling of our Association has changed to any extent in this connection in the last few years.

It is a matter of some satisfaction to us that the junior association have, up to the present, preserved their individuality. It has always seemed to us that our objects could be best achieved if this individuality were preserved. The fact that we are still able to continue thus after two and a half years of nationalisation can only be ascribed to the fact that the gas boards are agreeable to this state of affairs.

The basis of the successful operation of any professional or technical association must lie in the maintenance of a high standard of examination qualifications. The recent redrafting of the examination requirements of the Institution is evidence of this fact and this has, in turn, affected our Association. If we are to operate successfully under the new system we must adhere to our qualifications for membership based on the Institution examinations. Only by so doing can we achieve our main object of assisting our student members to acquire corporate membership of the Institution. Any tendency to admit to our Association persons who do not intend to acquire ultimately this, or an equivalent qualification, should be resisted. There is, nevertheless, provision in the Association rules for the admission as members persons who, though lacking the necessary examination qualifications through force of circumstances, possess wide practical experience.

It has been suggested from time to time that certain professional men of a clerical rather than practical connection with the industry should be admitted. Again there are obvious difficulties in such a course. Generally speaking only a very few of the 400 odd members of our Association are members of other technical associations and they attend few meetings other than those of our Association. With the opening our our ranks to further classes of professional men I fear this would no longer apply. It is felt that this step would not assist the objects of the Association to a substantial degree.

Education

The older members of our Association will be aware of the profound changes that have occurred over the last 10 or 15 years in the training facilities available for young people leaving school. The main result has been the gradual elimination of courses based on evening study by those which assume attendance on one full day per week. The stage has now been reached where it is almost impossible to acquire a professional qualification of any kind by means of evening study alone. At the same time enlightened employers regard the provision of one day a week for this purpose, up to the age when the course might reasonably finish, as a condition of employment. None of us trained under the old regime will deny the desirability of this change, but it introduces difficulties when specialised studies are involved.

In the case of gas engineers, for example, it means that the provision of day teachers in this particular subject must be forthcoming if the Institution examinations are to be taken successfully. The responsibility for the provision of such teachers devolves on the area boards, and the position in certain areas will be extremely difficult. Students in some cases will be spread over a wide area and travelling to one centre by public transport may be difficult, if not impossible. In this respect our own area has some peculiar problems, but it is clearly desirable to cater in the first place for the areas which contain the largest number of potential students. In the normal way these students will not call for instruction in the specialised subjects of gas engineering till quite a late stage in the six or seven year course; after the section A examination has been taken.

One of the major problems in this connection is the provision of teachers for the gas engineering subjects. Clearly the ground to be covered in supply and manufacture is beyond the scope of a single individual and several teachers would be called for. If such teachers are possessed of the necessary knowledge and experience to carry out their duties adequately, they will probably find wider opportunities in branches of the industry other than teaching. In such circumstances it

will be very difficult to maintain continuity in such gas engineering courses. A possible way out of the difficulty is to establish courses in gas engineering subjects at the technical colleges in two or three large centres, the lecturers being provided by the large gas undertakings in the vicinity. By such means every aspect of supply and manufacture could be covered by experts without imposing too great an inconvenience on any particular individual or undertaking. Unfortunately it would be difficult to provide facilities for such training for students in outlying areas under this arrangement. Nevertheless, it would not be unreasonable to suggest that the difficulties might readily be overcome by arranging for interchange of staff between undertakings, in certain instances. In any arrangement such as this, liaison between the large centres and the board and responsibility for the maintenance of the courses would have to be in the hands of a single individual or education officer, with a deputy, whose duties would be largely administrative. This education officer would not normally lecture, but should be able to do so on particular subjects when necessary.

Works Visits

It should be possible to arrange for a comprehensive programme of works visits under such a scheme, and the visits of the junior association would reinforce this programme by embracing visits to contracting firms and works outside the immediate vicinity. The visits arranged by our Association would have this purpose fully in mind, and to this end the closest co-operation with the education officer would be necessary. Liaison with the Institution would be provided through the District Gas Education Committee. It is clearly desirable from all points of view that the students should enrol in the Junior Gas Association. The new Education Regulations of the Institution of Gas Engineers will shortly come into full operation and the new Associate Membership examination will replace the previous Ordinary and Higher grade examinations. The possession of a Higher National Certificate in mechanical engineering gives exemption on a subject for subject basis from the Associate Membership examination and, in general, the only further examinations to be taken will be in gas engineering. As one of the many members of the Institution whose academic training has been largely chemical, I am concerned at the difficulties facing students with pure science Higher National Certificates who wish to pass the Associate Membership examination of the Institution. These students have, in effect, to commence a completely fresh course of training, and I feel that few will find themselves able to do so. The establishment of Higher National Certificates in Chemical Engineering would presumably lead to similar difficulties for the students involved. The gas industry tends to embrace a continually increasing number of such students and in present circumstances the majority are unlikely to become corporate members of the Institution.

The labour position at the present time is in many ways a happier one than we have experienced for many years. This may be due to the general rise in the standard of living at the lower income levels which has taken place over the last few years. Nevertheless, certain changes are taking place which have had a particular effect on certain gasworks operations. I refer to the increasing difficulty experienced in obtaining labour to deal with the more uncongenial operations on the works, notably in connection with oxide purification and the retort house. The general reluctance to accept jobs of this nature is certainly more than a passing phase and it may be expected to continue. One of the direct results is the displacement of certain processes involving arduous manual labour by mechanically operated systems. The widespread use of mechanical producers on the Continent and the increasing interest in methods of hydrogen sulphide removal other than by oxide boxes are believed to be the results of this trend. The more obvious use of mechanical handling on a much wider scale is clearly a deflection of the same tendency.

The increased use of mechanical plant as distinct from manual operations has generally been assumed to result in decreased costs, but this is not necessarily the case. Even in the more obvious examples of handling materials, mechanical plant is frequently more costly to operate than manual labour, particularly in small scale and intermittent operations. In spite of this no one would seriously suggest that we should revert to the older methods of the 'pick and shovel brigade,' even if the labour were forthcoming.

Considerations such as these have for some time carried a great deal of weight in the policy of the Liverpool undertaking. The use of mechanical producers has been on a scale which is unusual if not unique among undertakings not employing coke ovens. The result has been to improve immeasurably the working conditions in the retort houses, and further improvement has resulted from the installation of scrubber standpipes and modifications to ventilating systems. In the field of H_2S removal also the Liverpool undertaking has shown a progressive attitude, and one of the first full scale plants of the Manchester-Holmes type was put to work at the Linacre works in September, 1949, to deal with 4 mill. cu.ft. coal gas per day. This plant has worked continuously since that time. As a result of our experience in these fields, certain interesting conclusions of a general nature have emerged.

Mechanical Producers

The modern producer plant even when supplying cold gas will give an efficiency of gas production higher than that of any other method and it is the most satisfactory large scale method of complete gasification we so far possess. It will deal with a fairly wide range of fuels, but will not handle dust. Its greatest disadvantage lies in the impurities carried by the gas leaving the generator, which are increased by the high gasification rates as compared with, say, step-grate producers. These impurities consist largely of dust, tarry and gummy material, hydrogen sulphide, and sulphur dioxide. If the gas is utilised hot, the dust alone must be removed and, since the sensible heat in the gas is to be preserved, dry cleaning methods are the only ones permissible. This question of dust in producer gas has always been one of the major factors militating against the use of hot gas from mechanical producers, and it is the considered opinion of some authorities that the cleaning of hot gas is so difficult as to be insuperable. Experience at Liverpool does not support this view. Examination of the dusts carried by hot producer gas shows that, when using sized No. 3 coke, 85% of the dust is above 40 microns in size and only 1% or 2% is below 5 microns. It is quite feasible and practicable to remove almost completely dust over 40 microns in size by means of correctly designed cyclone separators while at the same time removing a proportion of the dust below this limit. Under normal conditions of operation the use of cyclone separators of high efficiency will impose considerable back pressure on the generator and it becomes necessary to boost the gas to about 12 in. W.G. This presents no difficulty and the power required is negligible in comparison with the sensible heat content of the gas boosted.

Since the gas leaves the generator at a temperature of 400°C. stainless steel impellers are desirable although not essential. In these circumstances, hot producer gas can be cleaned effectively, and provided it is fed into the combustion chamber direct its utilisation presents no difficulties. If, on the other hand, it is desired further to preheat the producer gas in recuperators, considerable trouble may be experienced if the producer gas contains tarry matter, as is frequently the case. This tarry material is very readily cracked on the hot walls of the recuperators and the resulting carbon is in a very finely divided form and voluminous in nature. Ultimately it may cause blockages in the recuperators which must then be burnt out. With regenerators this immediate trouble would presumably not arise, the carbon deposited on one part of the cycle being burnt off at another. Substantial improvements can be effected by ensuring that only coke of low volatile matter content is fed to the producers, but the trouble cannot be entirely eliminated. Probably the greatest difficulty arises with horizontal retorts since it is almost impossible to ensure that the coke is on all occasions of uniformly low volatile matter content throughout. The effect of small amounts of breeze containing 10% volatile matter and over adhering to

the coke will be cumulative, and serious blockage of the recuperators by very fine, highly reactive dust may frequently ensue. The immediate effect is to reduce the volume of fuel gas reaching the combustion chambers, and the volatile matter content of the coke discharged from the retorts rises. This coke in turn is fed to the producers and the tar-dust difficulties are accentuated. It is ironical that this state of affairs is similar to that obtaining with step-grate producers when high ash coals are carbonised, but the underlying cause is quite different.

The best solution, where a high degree of recuperation is essential, is to intensify it on the air side and to pre-heat the combustion air as effectively as possible, feeding the producer gas directly to the combustion chambers. It is emphasised that this problem only arises when the producer gas is pre-heated, and there are several very successful installations using hot mechanical dust removal without further pre-heating of the gas, on both vertical and horizontal installations.

It must be concluded from this that the supplying of hot semi-cleaned producer gas to carbonising plants via recuperators is a problem the solution of which seems to be almost insuperable. On the other hand semi-cleaned producer gas which is substantially free from dust may be fed directly to the combustion chambers without difficulty and substantial benefits may ensue.

The use of breeze on mechanical producers accentuates the problem discussed here and can seldom be defended where the hot gas is to be used for heating carbonising plant.

Increased Throughput

It is largely due to the difficulties of cleaning hot gas that producer gas for firing coke oven installations is always cooled and thoroughly cleaned. It was appreciated at an early stage in the use of mechanical producers at Liverpool that, when applied to carbonising plant, they might provide an opportunity to increase the throughput of existing installation. For this reason it was decided to demolish an old horizontal house of two benches completely and replace it with an installation of horizontal chambers with a heating system designed on coke oven lines. The original installation carbonised 150 tons coal per day on a 12-hour schedule whereas the new installation of chambers will carbonise at least 200 tons coal on the same schedule. The coal carbonised per square foot ground area per hour was 1.6 lb. and this will now be increased to 2.1 lb. This, however, is not the limit of the possibilities, and carbonising periods of 10 or even eight hours may be possible. Features of the new installation are the regenerators beneath the chambers which will enable air and producer gas temperatures approaching those obtaining with step-grate producers to be achieved. It is quite true that, theoretically at any rate, a well designed recuperator can be as efficient as a regenerator, but the recuperation systems on many horizontal installations are far from well designed. The fact that the flame temperatures attainable with step-grate producers are so high and leave so much in hand has resulted in little attention being paid to the air recuperators. In spite of the fact that the heat content of the waste gases entering the recuperators is approximately twice that of the air, it is unusual for the air entering the setting to approach the temperature of the waste gases entering the recuperators. Under normal conditions an air temperature of only 600°C. is attained with waste gases in the region of 900°C. It is believed that with regenerators, the effective filling of which is a simple problem in comparison with the building of effective recuperators, a great improvement in heat exchange performance will be attained.

In the normal way, the cooling and purification of producer gas is carried out by a Lymn washer followed by a centrifugal gas cleaner and a filter box. With this particular installation feeding three horizontal houses, one of which was regenerative, a particularly clean gas was required. For this reason it was decided to install electrostatic precipitators in place of filter boxes to ensure the removal of the small amount of tar and gummy material always carried forward in producer gas cleaned by the usual methods.

The amount of material removed in these electrostatic precipitators is small and of a sticky nature. To overcome difficulties with the removal of the deposits from the electrodes, the Dougill method of vaporising oil into the incoming gas has been installed and is proving completely successful. It is clearly important that the electrostatic precipitator should operate on thoroughly cooled gas to ensure complete absence of further deposition from the gas by after-cooling. A further refinement in this system is the provision of a cooling tower for handling the cooling water from the Lymn washers which is considerable. This cooling water system is provided with settling tanks to remove the large amount of coke dust carried down from the washers. In spite of this small amounts of dust remain in the circulating water and cause serious erosion of the circulating pumps. At the same time the removal of the coke fliers accumulating in the settling tank is something of a problem.

To overcome these difficulties, cyclone type dust extractors at the outlet of each generator should be very successful. The bulk of the dust removal would then take place prior to the wet washers and the disposal of this dust would be much simpler.

Liquid Purification

The removal of hydrogen sulphide by liquid methods has been widely practised in the United States and on the Continent for many years. Of the established methods being used in the United States at the present time the Thylox and Girbitol processes are probably the most successful, but they both possess disadvantages in regard to the degree of purity of the clean gas and difficulties in the disposal of the products from the process. Neither process will purify down to the standard required in this country at the present time and oxide boxes would be essential to complete the purification. Logically, the use of oxide boxes for this purpose would not be acceptable, quite apart from the difficulties which are generally inseparable from the operation of catch boxes. Some easement in the existing standards for gas purity in respect of hydrogen sulphide and more logically a modified standard based on the total sulphur content of the gas have frequently been advocated. The practical difficulties associated with testing introduced by such an alteration are great, however, and the inference that if the gas is free from hydrogen sulphide it is also pure in other respects has, generally speaking, justified itself in the past. The development of modern instruments should nevertheless be able to take care of any modified requirements for purity, which are considered by many to be overdue.

Be that as it may, it is likely that the present standards will remain for some years yet and they certainly provide an exacting criterion for the development of new processes for hydrogen sulphide removal. The number of liquid plants installed in this country in the past have been few and invariably of the 'one off' variety. None has stood the test of time and until recently the dry box system has never been seriously challenged.

The present situation of the Manchester process is, however, quite exceptional. The number of such plants in operation or under construction is such that one can be reasonably sure that they have come to stay. The demand for a plant of this type has become more and more insistent as the shortcomings of the oxide box method, particularly in respect of labour requirements, have made themselves felt. It is indeed striking that so many plants of the Manchester type are being installed while so much development work remains to be done. This fact alone can be taken as a measure of the demand for an alternative to oxide boxes. Considerable experience has been obtained at Liverpool during two years' operation of a Manchester type plant. This is not a suitable occasion to go into the operational details of this plant, and this will no doubt be done at a more appropriate opportunity in the future, when the process is more fully understood. Nevertheless, certain general conclusions, both positive and otherwise, bearing on the future of the process have emerged, which are of interest to the industry. The Manchester process is a modified form of the Koppers Ferrox process which had some success

in America in the 'twenties but was eventually abandoned there. The main feature of the Manchester process is the multi-stage washing system using fresh washing medium in each stage, and the high rate of liquor circulation. The process was originally designed on the assumption that the reactions involved were similar to those occurring in oxide boxes—that is to say, the cyclic sulphidation and reoxidation of hydrated ferric oxide. The low solubility of hydrogen sulphide is overcome by using an alkaline washing medium as in the Seabord process, and delay tanks are introduced to allow the fouled liquor time to react with the suspended iron before it passes to the oxidation stage. The oxidation is accomplished by blowing with air, and the liberated sulphur is preferentially frothed off, as in the original Ferrox process. With a 90% removal in each stage, five or six stages were considered adequate for compliance with the Ministry of Fuel and Power's requirements for purity. The original Liverpool experimental plant installed by W. C. Holmes & Co., Ltd., was expected to have a capacity of about 4 mill. cu.ft. of coal gas per day. This figure has been achieved on occasion and in its present form the plant could be operated on horizontal coal gas at this figure.

During the two years' operation at Liverpool the plant has operated on horizontal coal gas, horizontal coal gas plus producer gas, carburetted water gas, and vertical coal gas. The alkali used has been either soda ash or ammonia or a mixture of the two.

The S.M.O. System

At this stage mention should be made of the S.M.O. system of liquid purification which has been operating on coke oven gas in Holland with some success for many years. Fundamentally this process is very similar to the 'Auto' process operated for many years by I.C.I., Ltd., at Billingham on a pilot plant scale. They both depend on the formation of complex iron cyanogen compounds for the oxidation side of the process. Now, in general, gases from the carbonisation of coal always contain hydrogen cyanide in amounts varying from 20 to 80 grains per 100 cu.ft. Since the hydrogen cyanide arises from the decomposition of ammonia, the higher the temperature of carbonisation the higher the hydrogen cyanide content. Under such conditions the formation of complex cyanides always occurs in practice in the Manchester process, and varying amounts are present in the circulating liquor. With gases containing high concentrations of hydrogen cyanide the circulating liquor is always blue or green when fully oxidised and may contain as much as 2 grammes per litre of ferric ferrocyanide. There is no doubt that where these two processes go on together purification is very much improved. One would expect that the purification of carburetted water gas containing very little hydrogen cyanide is relatively difficult, and this has been found the case in practice, although purification to the legal requirements is still possible without difficulty.

Whenever liquid purification is discussed the question of corrosion is always prominent. It is true that many liquid processes have run into corrosion difficulties, but we have observed no serious cases of corrosion with the Liverpool plant and after more than two years' operation it is safe to conclude that this aspect can be ignored. This can be ascribed to the high pH of the circulating liquor coupled, possibly, with the large reserve of active iron in the circulating liquor.

Perhaps the most striking conclusion from plant operation is the relative efficiency of the washing side of the process The plant has successfully washed 7 mill. cu.ft. per day of carburetted water gas. The limitation of the capacity of the plant is set by the capacity of the oxidation vessels and there is every hope that this side of the plant can be substantially improved and the overall capacity increased. It is of some significance that the sulphur loading of the oxidisers was substantially less on 7 mill. cu.ft. per day of carburetted water gas than when on 4 mill. cu.ft. per day of horizontal gas. In both cases the oxidation set the limit to the gas throughput.

A great deal of criticism of the Manchester process has arisen from the possibility of blockages in the circulating system due to the high concentration of suspended solids in the liquor. It must be admitted that blockage in the board filling of the first taker tower has occurred. This blockage is almost certainly due to the high proportion of sulphide present in the first tower. The difficulty has been overcome very simply by running the first tower without filling. The efficiency is thereby reduced from 90% to 65%, but the removal is sufficient to protect the second tower filling. Blockages at other points in the system have never occurred.

In concluding these very general remarks on the process, it can be said that the Manchester-Holmes plant at Liverpool has run continuously for nearly two years. At no stage has the chemical side of the plant given any serious difficulty. Mechanical shortcomings are inevitable in a plant of this type, but these can readily be overcome. The plant has provided information which will enable a completely reliable plant to be devised which would be capable of operating without oxide boxes. The working up and disposal of the sulphur produced has given considerable difficulty, but the solution of this problem is believed to be in sight, and when this is achieved the plant should be able to compete, in certain circumstances, with oxide boxes, over which it possesses so many advantages. The plant, of course, gives rise to peculiar effluent problems the solution of which depends largely on local circumstances. Oxide boxes provide a similar problem and there have been occasions when spent oxide itself might almost be called an effluent.

NORTHERN JUNIORS

ON September 28 members of the Northern Junior Gas Association visited the railway workshops of Messrs. Thomas Summerson & Sons, Ltd., at Spennymoor, afterwards proceeding to Darlington to inspect the firm's foundries and machine shops at Albert Hill.

The members were able to see work in progress on many types of railway siding layouts. In course of manufacture were a double slip diamond crossing for the I.C.I., tandem turnouts for the Cargo Fleet Iron Co., and 60 lb. standard flat bottom rails for export. A new design in 109 lb. flat bottom rail for the Lackenby steel works of Dorman Long, and 50 lb. 3 ft. gauge turnouts on steel channels for underground colliery work, were also being manufactured.

Typical of the work in progress is the guarded single, or Barry slip. This was designed, manufactured and laid by Summerson's for the Southport gasworks. It has a straight slip through between two curved intersecting tracks. Single back slips of this type are often called Barry slips, guarded for laying flush in a tarmac roadway. The rods are enclosed in cast iron troughs with removable lids, and the lever boxes are of the flush obstructionless pattern. All chairs are bolted to rails, no keys being used.

Summersons have just completed the modernising and extending of the railway track at Howdon-on-Tyne gasworks. To service the extension of the works, a large area of new track had to be laid. It includes a double slip, a scissors crossover, and guarded and single turnouts.

Important railway installations have also just been completed at Stockton gasworks, and improvements and extensions to railway sidings at West Hartlepool works, are now in progress.

Tea was served to members in the canteen of the Darlington works when Mr. T. H. Summerson (Managing Director) welcomed the visitors and gave a brief description of Summerson's organisation. Mr. J. E. McManus (President of the Northern Juniors) responded and expressed the thanks and appreciation of the Association to Messrs. Thomas Summerson & Sons for the facilities granted and the hospitality accorded.

North Western Staff Conference

SMALL GROUP MANAGEMENT

By WILLIAM OLDHAM,

Group General Manager, Furness Group, North Western Gas Board

The Board has now had about 18 months of group operation, and the author examines some of the problems which have arisen in organising one of the smaller groups. He explains that, while the policy of the Board and the directives arising therefrom apply equally to all groups, their implementation presents problems to the smaller groups which are not so apparent in the larger groups. The latter, with their greater resources, were equipped to accommodate themselves readily to the new set-up, whereas the smaller units, lacking equipment and technical and administrative facilities, have presented a formidable array of reorganisation and management problems. The following is an abstract of the paper.

GEOGRAPHICALLY the Furness group is at the extreme north-westerly corner of the Board's area. The Irish sea forms our western boundary. An irregular line running N.E. from Ravenglass on the west coast to Lake Wastwater, thence across Scafell and turning east at Sprinkling Tarn through Langdale to Coniston, forms our northern boundary. A line running due south along Lake Coniston to Morecambe Bay forms our eastern boundary. The total area covers approximately 230 sq. miles. Much of the area is useless from a gas development point of view as it consists of wild but magnificent country with many scattered hamlets and very small villages, Lake Coniston, and the Duddon Valley.

The principal town is Barrow-in-Furness where our group headquarters is located. Within reasonably quick access to Barrow we have Dalton-in-Furness (3 miles); Askam (5¼ miles); and Ulverston (9 miles). Millom and Haverigg lie across the Duddon Estuary in Cumberland and are 25 miles by road from group headquarters along a tortuous and hilly route.

Our nearest neighbours are the Kendal group 33 miles away and the Lancaster/Morecambe group 45 miles away. We are approximately 100 miles distant from the Board's headquarters in Manchester. It will be seen that we are somewhat isolated from the rest of the Board's area, and within our own group Millom is isolated from the rest of the Furness group. We must therefore be self-reliant, and the question of coal stocks, tar storage capacity, etc., is more vital to us than if we were situated in the industrial heart of Lancashire. The following data of our four undertakings will help to complete a mental picture of the group.

UNDERTAKINGS IN THE FURNESS GROUP

	Barrow	Dalton	Millom	Ulverston	Group Totals
Annual Production:					
Gas (mill. cu. ft.)...	625	58	73	92	848
Coke for sale (tons)	21,287	1,477	2,508	2,361	27,633
Breeze for sale (tons)	2,832	—	—	—	2,832
Tar (tons) ...	2,214	183	263	374	3,034
Benzole (gal.) ...	79,132	—	—	—	79,132
Spent oxide (tons)	368	34	43	60	505
Total equivalent thermal output of all products (therms)	9,508,000	683,000	1,022,000	1,165,000	12,378,000
Declared C.V. ...	450	450	450	500	
Consumers:					
Domestic—					
(*a*) Ordinary ...	1,823	221	286	957	3,287
(*b*) Prepayment	15,149	2,020	1,845	1,974	20,988
Total Domestic ...	16,972	2,241	2,131	2,931	24,275
Industrial	73	2	17	28	120
Commercial ...	587	95	61	196	939
Public Administration	114	15	18	36	183
Total	17,746	2,353	2,227	3,191	25,517
Miles of main ...	106	23	18	22	169
Population	67,473	10,394	13,424	10,076	101,367
Main industries ...	Ship-building Engineering Ironworks		Ironworks Tannery Light Indus-tries	Agricultural Glaxo Products Light Engineering	

The first step was to make a rapid survey of plant, equipment, administrative facilities, and available personnel, and to formulate a policy accordingly. This survey revealed the following:—

Carbonising plants generally were in poor condition and required reconstruction at all works, the type of plant and approximate dates of erection were as follows:—

Barrow	Machine charged horizontals	Two beds ...	1931
Dalton	Stop end horizontals with	Two beds ...	1915
	Morris charger	One bed ...	1935
		Two beds ...	1904
Millom	Stop end horizontals hand	Two beds ...	1906
	charged	One bed ...	1948
	Stop end horizontals with	Four beds ...	1905
Ulverston	Morris charger	Two beds ...	1909

All works had producer gas dilution plants.

Lack of Stand-by Plant

The condition and adequacy varied considerably as between works. Lack of stand-by plant was particularly noticeable as was the result of neglect of repair and maintenance. With the exception of Dalton the nominal capacity of purification plant was adequate, but in some instances operational control was deficient. The purification plant at one works was found to be in a serious condition. The state of the supporting structure of the main purifiers and of the overhead handling gear was such that the structure had become dangerously weakened. Out of 16 covers only two were sound.

Throughout the group the holder capacity was inadequate and the effective capacity was reduced owing to inner lift pressures being too low to maintain sufficient pressure on town supplies. Out of eight holders only three had proper anti-freezing equipment and only one of these had the equipment properly connected to a steam supply.

There was at Barrow a district holder of uncertain age and unusual design—a three-lift in brick tank, the outer lift being column guided and the two inner flying lifts rope guided. The date of the outer lift was unknown. The middle lift was erected in 1895 and the inner lift in 1908. The total capacity was 400,000 cu.ft. but the effective capacity was reduced to less than half this as the inner lift was useless and half the outer lift was out of action owing to damage following frost in 1947. The holder was found to be in a serious condition. There had been another holder on this site—an exact replica of the existing one—but this had been totally destroyed in 1935 by an accident suspected to have been caused by a failure of the sheeting (see 3rd Report of the Gasholder Committee Appendix 10 Institution of Gas Engineers—Transactions 1936-37). This holder had never been replaced, the tank having been filled with ashes. The district supplied from this station had greatly increased its peak load requirements while effective storage capacity had been considerably reduced.

It is not unusual to find that the smaller works are deficient in those facilities which are taken for granted in the larger

units, and the Furness group is no exception. The following is a list of such items and it is not always realised how increasing loads can affect works services other than carbonising plant. Tar and liquor storage accommodation and pumping equipment—inadequate. Tar and liquor separation—generally crude and inefficient. Mess room accommodation, workshops and stores, weighing machines and equipment, coke storage accommodation—either non-existent or inadequate. Coke grading—not one undertaking had a screening plant and in all cases coke was sold in ex-retort house condition. Waste heat recovery—all steam raising by solid fuel. Drainage—generally deficient and serious enough at two works to jeopardise production under certain conditions. Mechanical handling—the wheelbarrow and shovel appeared to be predominant. Electrical services—generally deficient and showing lack of maintenance. Lighting—inadequate, and in too many instances no consideration had been given to the men who have to work in artificial light. In many cases open flame lighting in use where flame proof equipment should have been installed.

Of the four undertakings only Ulverston and Barrow employed works fitters. Barrow had reasonably well equipped workshops and the nucleus for a group maintenance organisation. It is obvious that in many cases it had been the policy to meet continued rising costs in a world of rising prices at the expense of maintenance—particularly painting—in a futile effort to avoid financial losses—a policy which only postpones the inevitable. There is every credit in offsetting rising costs by increasing efficiencies, but not by avoiding essential maintenance.

District Conditions

Many parts of the area suffered from pressure deficiency but not always from the same cause—mains too small for peak loads; mains satisfactory but services too small; naphthalene and/or rust deposits; too great a pressure differential whereby consumers wrongly assumed poor pressure conditions because of severe pressure variation; under-capacity boosters supplying outlying areas.

Conditions in the Dalton and Askam districts were serious. The station governor had been by-passed to give optimum pressure on the 8 in. feeder main to the district. Within a distance of half a mile the initial pressure of 92/10 in. W.G. reduced to 32/10 in. W.G. and so affected the supply to service mains at the terminal point that pressures fell to zero at the furthest points of the system. Cutting out sections of main disclosed extensive deposits of rust throughout the distributing system indicating faulty conditions of gas production.

Askam was fed by 2½ miles of 6-in. main from Dalton. By means of a booster fixed at the Askam end of the main peak load pressure at Askam was boosted by drawing from Dalton. There was the possibility of vacuum conditions occurring in the 6-in. main under certain conditions.

Barrow relied on an old steam driven exhauster, acting as a compressor, to perform the triple duty of transferring gas between holders, boosting to Hindpool Road holder station, and boosting to the Dalton district. There was no stand-by and the machine could not be stopped for periods long enough to carry out major maintenance. The fact that the machine has continued to function for so long in this manner is to the credit of the manufacturers and the ingenuity of fitting staffs.

Feeder mains generally did not extend far enough into the district, diminishing in size very quickly along their routes to become service mains. Mains had not always been adequately recorded on plans; pumping of syphons was usually haphazard as was their recording. Naphthalene trouble at one undertaking was giving rise to numerous consumer complaints which had risen to a peak of 217 complaints in one day during 1949.

Ulverston and Millom had no showrooms. Dalton had a town office in a terrace-type dwelling, the front room of which served as a showroom. A large detached house in the centre of the town served as offices at Barrow and the front room of the ground floor was used as a showroom. It is correct to say that we did not possess a single display window anywhere in the group.

Consumer service at Barrow took the form of split control whereby a separate organisation known as the stove and meter department was engaged mainly in the renovation of black cookers and cooker and meter fixing, while a small body of plumbers in a separate department carried out other consumer service not coming within the scope of the stove and meter department.

An examination of the meter position disclosed that out of a total of 25,339 meters in the group, no fewer than 9,531, or 38%, were of the old lights type. There was no proper emergency service in existence in any undertaking. Any incident or fault arising outside normal working hours meant a frantic search for personnel competent to handle the situation.

A considerable amount of hired transport was used throughout the group. Two of the undertakings had also to transport coal by road from railway sidings to works, and tar from works to railway sidings. At Ulverston this was done by horse and cart hired from the local authority. The extent of transport owned by the four undertakings was inadequate for the group as a whole, and consisted of a W.D. type Guy tipper, a long wheel base heavy Leyland, and two Ford vans. This number was reduced by one when a Ministry of Transport inspector ordered the Guy to be taken out of service.

Stores accommodation was found to be practically negligible. Stores and appliances were stocked in odd corners of any buildings where space could be found. The Salthouse works at Barrow had no stores, and the stores at the Barrow distribution depôt would only accommodate a few small items. There appeared to be no proper system of stock control, and such systems as were in existence could not cope with a situation where stores were dispersed all over the place and even in the open.

Coke Handling

None of the undertakings had coke screening plant; neither had they adequate storage accommodation. Little statistical information was available of consumer records. Lorries were loaded by shovel from the ground, or at Barrow by mechanical shovel. Bagging was done on the ground by shovel and the filled bags were manually lifted on to the vehicles. Coke was removed from the retort house at Barrow by electrically propelled coke bus, quenched, and either dropped from an overhead gantry straight into railway wagons where it was further quenched, or —discharged on to the ground for local sales. For a 'two-fuel industry' the methods for marketing one of our two major products were crude.

Of the four undertakings only Barrow possessed a laboratory and employed a chemist. Apart from a recently appointed station engineer at the Barrow works, there was no other technical assistance available to district managers. Dalton, Millom, and Ulverston had no gas examiner.

Similar conditions existed in the distributing side. Barrow employed an assistant distribution superintendent who, while fully occupied supervising fitting work, endeavoured to cope with distributing matters. The group as a whole was completely deficient in mainlaying personnel and equipment. Harassed district managers had no departmental specialists to whom they could delegate any of their duties and too often their attention was being diverted from important technical matters to deal with less important issues. Technical data were not readily available.

Prior to vesting day each of the four undertakings had been municipally owned and administered. All accounting work, billing and collection of accounts, payment of wages and salaries, etc., had been carried out by the financial officers of the respective local authorities. At Barrow and Millom meter collections were controlled from the offices of the financial officers of the local authorities. To complicate matters both Barrow and Ulverston had been joint gas and

water undertakings. Staff and workmen performed overlapping duties and there was no demarcation of stores and equipment.

Prior to the formation of group organisation, a decision had been made to terminate the agency agreements by which the financial officers of the local authorities continued to perform the duties they had formerly carried out for the undertakings. This decision had produced a condition of chaos at each undertaking where they had neither the accommodation nor the staff experienced in the accounting and commercial work of an undertaking. In my opinion this decision was premature and it would have been advisable to prepare each undertaking more thoroughly to accommodate the change-over before terminating the agency agreements.

A group accountant had been appointed, but his services were shared by three groups. He had no adequate staff, accommodation, or equipment, and the two other groups were also passing through a similar phase of changing administration. To assist in formulating a policy for group organisation and control there should have been available adequate statistics and comprehensive costs analyses. Without them there is a danger of organising to the needs of the moment rather than to a carefully preconceived plan. It is also essential to avoid accumulating a peak load staff to meet the impact of a sudden change-over, and for this reason administration staffs were working long hours during what was expected to be an interim phase. Initiation of a billing service was also complicated by the diversity of gas tariffs and coke prices at the four undertakings. To aggravate the position some of the work now coming within the orbit of our own organisation was already in arrears when taken over.

In the foregoing brief outline of conditions as they existed at the inception of group formation, I have been merely factual. I have not approached the subject in a spirit of pessimism, nor have I over-emphasised defects and deficiencies in order to magnify the problems involved and thereby glorify the new structure. Many units, and particularly the smaller ones, were in no fit condition at the outbreak of war and over the past 12 years have met increasing loads more by the sheer determination of personnel rather than by appropriate planning and proper maintenance and plant renewal.

Solution of the Problems

The Board's objective was to ensure that a constant supply of gas should be available at all times to all consumers at a constant calorific value and pressure, economically produced. Following the preliminary survey of our group resources, it was obvious that to achieve such objective would require: (*a*) A short term plan of intensive repair and construction to ensure continuity of supply pending completion of, (*b*) a long-term plan of interlinkage to effect economies in operation and of extensions to provide for future development. (*c*) Reorganisation of distributing systems. (*d*) A programme of consumer service reorganisation. (*a*) Formulation of a structure for personnel in order to weld together a co-ordinated team operationally and administratively efficient. (*f*) Improvement of our technical and administrative resources. (*g*) Wholehearted support and co-operation from the men and staff during a difficult transitional period.

A programme of intensive repair was immediately put in hand and simultaneously we proceeded with constructional work necessary to the long term plan for interlinkage. In this connection the resources of the Board's constructional and maintenance department removed many of the major problems. We are fortunate in the North Western area in having available at headquarters a technical and planning organisation not only able to advise on technical problems, but equipped to carry out both planning and constructional work. With their assistance far more has been accomplished in a comparatively short period than would have been possible had we been compelled to rely on our own resources.

One of the greatest fears of all managements is that of failure to give continuity of supply. Knowing some of the conditions prevailing this was a possibility dwarfing all other problems. The speed with which our headquarter's force went into action when made aware of our problems is an illustration of co-ordination between headquarters and groups.

We are not out of the wood yet, as reconstruction very often involves taking risks which that same reconstruction is designed ultimately to avoid, but the initial major problem is rapidly diminishing.

An intensive programme of repairs to carbonising plant was set in hand and attention was also given to ancillary plant problems. The extent of work being undertaken as short term immediate necessity so co-ordinated with the long term programming that some of the major items have been included in the schedule of long term reconstruction. It often happens that a specialised piece of plant, or equipment supplied originally by a specialist firm, is held up for repair or maintenance because the specialist firm cannot, for varying reasons, undertake the work or supply the requisite parts at short notice. This is a management problem which frequently occurs during the present abnormal times. We have been apt in the past to accept this as inevitable, not realising what resources lay to hand in the engineering industry of this country. A case in point was a difficult major repair and partial renewal of a vital part of our plant which was carried out successfully and at short notice by a firm of engineers who would not have been thought of in normal circumstances, and the cost was comparative. Another firm of engineers, previously unknown to us, constructed a number of large prefabricated specialist items and in this case at a lower cost. A different firm again undertook at very short notice a structural steelwork renewal.

Achieving the Impossible

Both our production and distributing engineers have secured many 'unobtainable items' by searching around for someone to make them. Headquarters has often been of service in this connection by its knowledge of the area's resources and the resources of other industries and contractors. Thus what sometimes seems an impossible problem can often be solved by persistence.

The problem of coke grading and handling was more acute at the Barrow works. Pending erection of permanent plant temporary measures were adopted by erecting a small second-hand rotary screen and bucket elevator to deal with land sales, and erecting a system consisting of three portable screening elevators supported by tubular steel scaffolding for loading into rail wagons. I sceptically named this arrangement 'The Coke Contraption,' but I must confess that as a temporary expedient it has been a success and has got us out of a serious difficulty. It has been in continuous operation since August, 1950, and will have to continue in operation through another winter load period. The system has also proved useful for handling coal from stock.

The output of breeze from the Barrow plant is now approximately 3,000 tons per year, whereas formerly it was *nil*. Temporary expedients, however crude, are better than succumbing to the temptation of waiting for that new plant to materialise.

The question of short term policy for coke grading at Dalton and Ulverston will be dealt with by transferring screening elevators and the temporary rotary screen from Barrow. The question of a long term policy does not arise. A portable screening elevator has been supplied to Millom. Long term plans are being incorporated in a reconstruction programme.

The subject of messrooms has been attended to under short and long term programmes. At Barrow a new messroom has been provided for stokers and at all other works any existing accommodation has been put into a fit condition and decorated.

At Barrow a combination of heavy rain and high tides has always been a serious problem. Flooding on occasions has backed up to the liquor wells and sealed off liquor lines. This drainage problem is dealt with in the long term programme.

At Millom the works site is low lying and near the sea. Water can never be kept out of the existing producer cellar.

The only way of dealing with this is to make sure the water enters the cellar at one point where it can be seen and does not percolate through at many points. As the water collects it is pumped out. This is effective under normal conditions, but severe storm conditions coinciding with high tides create an impossible situation. Retort settings showed signs of having suffered severe damage from this cause, and as each furnace has been rebuilt we have taken the precaution of leaving out the bottom recuperator tube to give a greater margin of safety. This is not a cure. The only solution is the longer term plan for a stage floor house with producers above ground.

Drains generally have been a very neglected item of works equipment. In most cases they are too small and inadequately provided with inspection chambers. They often meander when they should be straight. Lack of routine maintenance and inspection, cleaning of gulleys, etc., has resulted in the uneconomic use of labour in abortive efforts to remove breeze and/or tar deposits. Surface drainage in the vicinity of retort houses, coke plants, etc., in my opinion should be open culverts with well fitted chequer plate covers.

Interlinkage and Future Development

With a short term immediate plan under way, we simultaneously directed attention to the longer term requirements, not only to provide for the future but to ensure co-ordination of long and short term plans.

Prior to vesting date, Ulverston had agreed to take a bulk supply from Barrow. Sufficient pipes had been ordered to lay an 8-in. main as far as Dalton, continuing with 7-in. from Dalton to Ulverston, and by October, 1949, the 8-in. section had been laid to Dalton. The plan was not wholly complete —the Dalton/Ulverston route had not been finalised, wayleaves had not been negotiated, compression plant had been ordered to the extent of one 50,000 cu.ft. per hour steam set, but not in duplicate, and the question of control had not been determined. Neither had Barrow been able to implement the scheme as the output from the Barrow plant was insufficient. It was decided to make this the basis of a more comprehensive scheme, however, linking up Barrow, Dalton, and Ulverston and to concentrate production at Barrow. The scheme was economically sound and would safeguard the future position of both Dalton and Ulverston. For economic reasons it was also decided that Millom could not be included in the scheme and would be developed as an independent unit.

The first step in the development of this plan was to commence a reconstruction scheme of the Barrow works to ensure adequate plant capacity. Plans for this reconstruction scheme were drawn up showing three stages whereby the final stage would bring the total capacity of the plant to the maximum site capacity of the station.

Outputs at each stage of reconstruction are as follows:—

PLANT CAPACITY

	Therms per Day	
Existing plant reconstructed	9,800	
Extension of existing plant by additional bench of five beds of 10 retorts	5,075	
Total—Stage 1		14,875
Second retort house extension 14 beds of 10 retorts	14,210	
Total—Stage 2		29,085
Two C.W.G. sets	14,250	
Total—Stage 3		43,335

The initial total peak requirements of the three undertakings to be linked is 12,070 therms per day, so that Stage 1 provides for an increase of 23%, which, with normal development, should be absorbed by 1956. The full development of Stage 2 will provide for an increase of 140% over the initial peak load, which should be more than ample to meet long term development. Construction of Stage 2 need not proceed in one operation and will be developed in sections to keep step with load development. The necessity for Stage 3 will arise only in the event of large industrial development which cannot always be foreseen.

Although the full extent of reconstruction as planned may not be called for, it is necessary to plan such development to know the full site capacity and so determine at the outset the advisability of developing an existing site. It is also necessary to show full scale development to ensure that the initial stages will fit in with the long term development. The development of ancillary plant and other services and facilities have also to be considered in relation to carbonising plant, and whereas the latter may extend in one, two, or three stages, the former cannot always proceed in progressive stages, their full optimum development having to take place at one operation.

Work Well Advanced

Much of the constructional work of Stage 1 is well advanced. The retort house extension, the bench of five beds of ten 24 in. by 18 in. by 23 ft. silica segmental retorts, coal bunkers, and mouthpieces are complete. The building and settings are of the Board's own design and the actual construction, including foundations, has been carried out by the Board's constructional department, which commenced on site in June, 1950. This is no mean achievement in these days of long delivery periods for plant.

Drainage at the Barrow works goes into a tidal stream flowing through the works, and the new drainage system incorporates a 36 in. diameter main sewer into the stream which is being enlarged and paved. The drainage part of the reconstruction has had some considerable thought from the Board's civil engineering section, which has designed the whole system to form a reservoir having a minimum of one hour's capacity under severe conditions, which period is sufficient for the turn of the tide. The work on the stream itself has presented a problem due to silting and many years' deposition of tar.

It is not proposed to detail all the items involved which are mainly orthodox, but I will refer to two of the items. These are the new compressor house which will be pressurised, and the new design of 'Tray' purifiers. I have mentioned pressurising of the compressor house because this is usually only found on very large units. There is no valid reason why the smaller unit should not have smaller editions of all the facilities which help to provide better conditions and restrict dust and dirt.

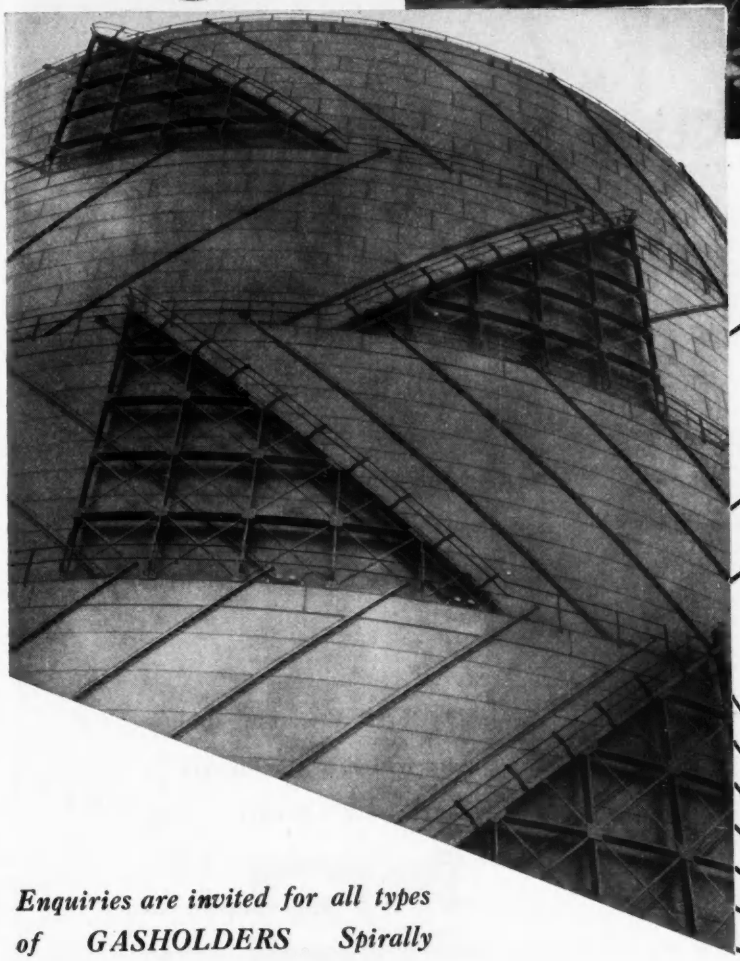
'Tray' Purifiers

The 'Tray' purifiers are of interest because they will solve one of our biggest problems—that of purifier changing. Having seen one of these purifiers turned out of the gas stream, changed and put back to work again in just under half a day, the potential value of this design was immediately apparent. The trays can be renewed at convenience or to an organised routine—preferably the latter. Although these purifiers are planned as an 8 mill. set which is very long term, they need not initially have full tray equipment. Trays can be added, up to maximum capacity, as carbonising plant expands.

Simultaneously with the development of constructional work to make Barrow the central producing station, it was necessary for the distributing section to plan their arrangements for handling the gas. The route for the Barrow/Dalton/Ulverston main was finalised, wayleaves were negotiated, and the laying of the main was placed to contract. The laying of mains along routes across country in rural areas necessitates a number of wayleave agreements and distributing engineers have to be possessed of much tenacity of purpose in pursuing the initial negotiations. The work of laying this main is proceeding and is expected to be completed this year.

As we were committed to the size of pipes (7 in.) already ordered and delivered, and as this size is not in common use,

From any angle..



. . . and throughout every stage of construction, is evident the characteristic of sound design and workmanship which stamps every Gasholder installed by Dempster of Elland.

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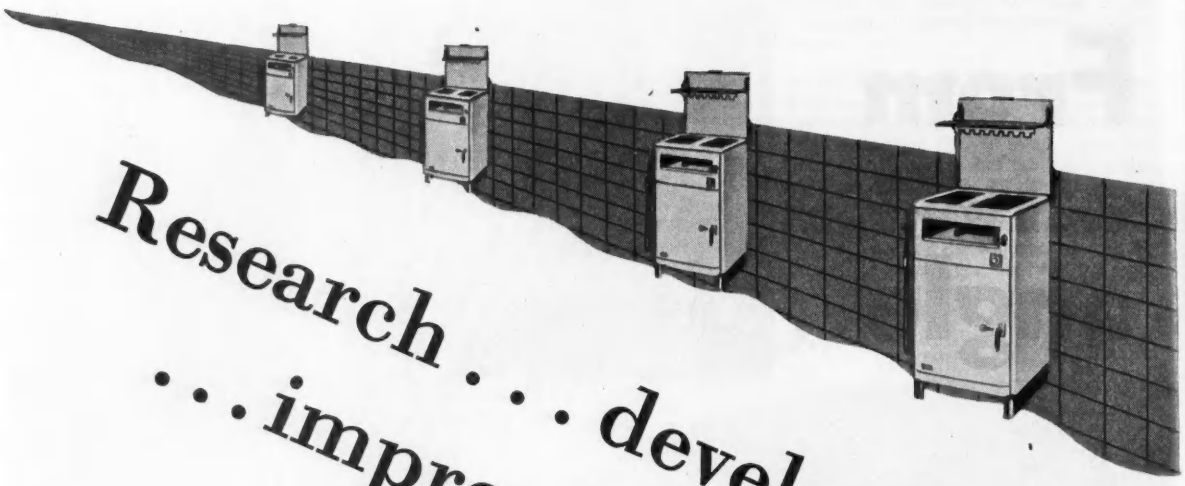

Research . . . development . . . improvement

Many women learn the elements of cookery and household management from their mothers. Of more than two million housewives who have become users of NEW WORLD Gas Cookers since 1923, no doubt the majority repeated after their mothers : " *It's a* NEW WORLD *for me !* "

★ ★ ★

It is not by chance that the words NEW WORLD have become " household " words in more ways than one. Rather is it the result of a considered and consistent policy—the Radiation policy of Research . . . Development . . . Improvement. From the beginning, thirty years ago, this policy was devised to give the gas industry and the gas user progressively better cooking appliances.

★ ★ ★

It is a forward-moving policy . . . a policy which has achieved, in the current NEW WORLD Gas Cookers (the 1840 and the 4180), appliances which are simpler to install and to service, easier to clean and to keep clean, more sparing in use of gas than their forerunners of earlier years.

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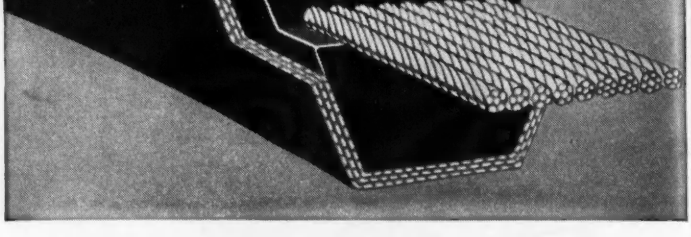
GOODYEAR V-BELTS are of uniform, accurate cross-section. The load is carried by a layer of high-tensile endless cords, positioned in the neutral plane of the belt. Here they avoid extremes of tension and compression, and their full strength is therefore concentrated on the main task—carrying the load.



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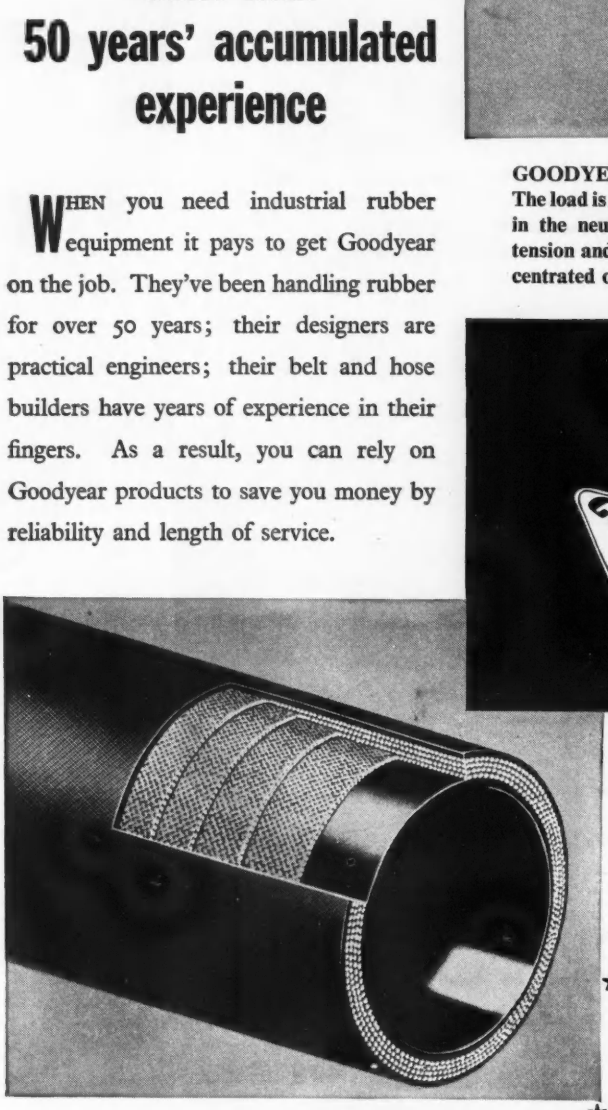

THIS GOODYEAR HOSE is built from high-grade rubber tube wrapped in tough rubberized fabric for greater strength. A protective cover of bruise- and abrasion-resisting rubber assures lasting wear, and scientific arrangement of the fabric plies minimizes kinking.

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INDUSTRIAL RUBBER PRODUCTS

TRANSMISSION BELTING · V-BELTS

CONVEYOR BELTING · INDUSTRIAL HOSE

the securing of specials and syphons was a serious problem. Many of these had to be specially made for us, including patterns. We are also indebted to those groups who helped us in this connection, which demonstrates the inter-group mutual aid spirit which is becoming more pronounced as group officers are becoming better acquainted.

The next step was to arrange for adequate compression plant and equipment. There was already a 50,000 cu.ft. per hr. steam driven reciprocating compressor on order, and it was decided that this should be in duplicate with an alternative form of drive. Fortunately another group had already on order a 60,000 cu.ft. per hr. reciprocating type with electric drive which was too small for their increased demand and this order was diverted to us. This again demonstrates another potential value of area organisation, whereby plant too small for one unit can be passed on to a smaller unit with resultant economy to the area as a whole. These two machines will serve the bulk supply line and two further machines, each of 100,000 cu.ft. per hr. impeller type, electrically driven, have been included to serve Barrow's own internal supply line to the Hindpool holder station. The four machines will be housed together in the new compressor house at the Barrow Works.

A method had now to be determined whereby we could remote control from a central point the supply of gas to the three district stations—namely, Hindpool, Dalton, and Ulverston. It was decided that the most efficient method would be to install remote control equipment at the new compressor house with indicating and metering facilities at each station, thereby securing automatic operation of the district stations from the central control point day and night.

All the district holders will be used with common inlet and outlet mains so that they act as reservoirs only, taking gas into holder when supply exceeds demand, and vice versa. It is contended that this simplifies the scheme and reduces the number of holder cut-off valves needed. The use of common inlet and outlet mains may be criticised, but it must be emphasised that these are district holders and it is considered that production should hand over to distribution gas of constant characteristics without the latter having to perform the functions of a cocktail shaker.

Thus in the case of Ulverston, which is a two holder station, the lighter holder (No. 2) will be fitted with a 14 in. holder valve which will close when holder is full and open when the district pressure falls below holder pressure. The heavier holder (No. 1) will be fitted with two valves—namely, (1) a 12 in. holder valve which will close when holder is, say, two plates from empty, and open when district pressure is higher than holder pressure; (2) a ¾ in. holder valve which will operate the volumetric governor in the control house to close the flow when the holder is one plate from full, and to open when four plates from full.

In the case of Hindpool, these two holders will be identical and will be worked as one. Thus a ¾ in. holder valve will be fitted to one of the holders only which will operate the volumetric governor as before.

Facilities at Dalton, Ulverston, and Hindpool

(*a*) Remote indication of pressure at the inlet to the volumetric governor.
(*b*) Remote indication of the flow through volumetric governor into the station.
(*c*) Remote control of the flow into the holder(s).
(*d*) Remote indication of the gasholder(s) stock with audible and visible alarms for high and low limits.
(*e*) Remote indication of two district pressures.
(*f*) Remote control (start/stop) and indication (running/stopped) of the station booster (Hindpool excepted).
(*g*) Remote indication and alarm of 'main electricity supply failure.'
(*h*) Equipment testing facilities.
(*i*) Telephone communication.
(*j*) Indication and recording of district flows (at holder stations).

The system is the Strowger, the remote control signalling apparatus comprising the usual telephone type relays and rotary switches mounted on 'jack-up' type bases which are arranged in rows on pressed-steel shelves in cubicles. Electrical connections between the relay bases are effected by means of multi-contact spring jacks, thus enabling the relay bases to be removable without disturbing the permanent cable form in the cubicle.

In addition to the remote control equipment, each holder site will have the necessary pressure recorders and district flow recorders, thereby keeping its own permanent records of output and pressures. It is not thought necessary to include these facilities in the remote control scheme. A single pair of pilot wires between the control room and each of the remote gasholder sites will be necessary. These will be rented from the Post Office authorities.

Continuous Stock Readings

Gasholder stock readings are continuously indicated on instruments (suitably calibrated to read stock) on the control panel. The system consists of a weatherproof transmitter which is mounted near the holder and is coupled to pulleys and counterweights actuated by the holder itself. It is designed so that by means of reduction gearing a shaft incorporated in the transmitter carrying eight cams is rotated one revolution as the holder rises from its lowest to its highest level, or vice versa. The profiles of the cams are cut differently and banks of electrical contacts (one contact per cam) are arranged in such a way as to be actuated by the cams. Each cam represents a different number of units of stock, as follows:—(A) 1 unit of stock; (B) 2 units; (C) 4 units; (D) 8 units; (E) 16 units; (F) 32 units; (G) 64 units.

When taken in combination, any number up to 127 units can be obtained—*e.g.*, for 21 units of stock the cam shaft would be in such a position as to cause contacts A, C, and E to close. One hundred and twenty-seven different codes are therefore available for transmission to the control room.

The system operates automatically, and immediately the holder height changes by a small predetermined amount, a coded impulse train representing the new stock reading is transmitted to the control room to correct the reading already displayed.

For the high and low limit position alarms limit switches are fitted on brackets in the appropriate position adjacent to the holder. The switches are actuated by bars fitted to the holder itself, and when either switch is tripped a specially coded impulse train is transmitted to the control room automatically to light the appropriate indicating lamp and to ring the alarm bell. The indications are given by means of coloured lamps fitted behind the gasholder symbol escutcheon plate in a three-way lamp unit having coloured glasses to indicate the following: Red (top limit), amber (intermediate position) and green (bottom limit).

When the holder reaches either the top or bottom limit the lamp indicating this position is caused to flash and an alarm bell to sound. The flashing can be changed to a steady glow and the alarm bell disconnected by operating the 'alarm cancel' switch.

The flow reading (input to station) is indicated on a calibrated circular instrument similar to those for the other readings on the control panel. The reading is displayed continuously except during the transmission of impulse trains when it is interrupted for a short period (a matter of seconds).

The transmitter is of the electrical type which converts the flow reading into a suitable electrical equivalent—*i.e.*, varying A.C. current. For the purpose of remote indication a small transformer is inserted in the electrical circuit and a proportional current is transmitted over the pilot wires to the control room where it is measured on an ordinary D.C. milliameter, suitably calibrated to read flow. A common orifice is used both for flow reading and volumetric governor.

Control of the input flow is carried out from the control panel by means of two push buttons. The control is a two-position one—*i.e.*, selection and control. In this way the possi-

bility of accidental operation is reduced to a minimum. The actual control at the holder station is effected by varying loading of the volumetric governor by means of a small electric motor and cam arrangement which performs the function normally carried out by hand control at the volumetric governor itself.

Broadly speaking, the operating procedure is as follows: The volumetric governor is first selected by operating the appropriate selector switch in the control panel; this causes a pair of windows above the common operating push buttons to be illuminated. The windows are sign-written to indicate the purpose for which the push buttons are effective—namely, 'increase flow' and 'decrease flow.' The push buttons are not effective until a selection switch has been operated.

'Increase' and 'decrease' operations are effected by momentarily operating the appropriate push button, and this operation causes the loading of the volumetric governor to change in such a way as to alter the flow by a certain fixed increment. Further operations may be carried out while the selection is held—*i.e.*, while the switch remains thrown. The actual flow reading on the panel is disconnected while the governor loading is being changed, but is restored immediately the change is complete. (This is not considered a disadvantage since the governor and relay system takes some seconds to attain its equilibrium state.)

Pressure readings are continuously indicated on suitably calibrated instruments on the control panel. A similar cam coding mechanism to that used for holder stock readings is employed, but in this case the cam shaft is rotated by a small electric motor.

Over-Riding Control

An over-riding control is provided on the control panel to enable the booster to be started at the discretion of the control engineer. This is carried out in a similar manner to that described for the control of flow—*i.e.*, by a double operation. In this case, however, when the selection has been made, a different pair of windows is illuminated above the common operating push buttons. These are labelled 'start' and 'stop.' The push buttons are then effective for either starting or stopping the booster motor. Indication of 'booster running' and 'booster stopped' is also provided by means of two lamp units containing coloured lamps.

Telephone communication is provided between the control room and the remote gasholder station, automatic ringing and connection being effected via the supervisory signalling apparatus. The procedure for making a telephone call is simple. All that is required is to lift the telephone handset, listen, and await the reply. The ringing of the remote telephone is carried out automatically. This procedure is similar for both the control room and the gasholder site.

With more than one remote gasholder station, the number of telephone instruments required in the control room is reduced by employing a small desk-type switchboard incorporating lamps and selection keys. On the occurrence of an incoming call from one of the gasholder sites, the controlling engineer could therefore connect his telephone simply by throwing a telephone type key and so connect his telephone to the particular incoming line. A similar procedure would be necessary for an outgoing call. The telephone handsets are of the standard type in use by the Post Office.

Indication of the blowing of the apparatus fuse at a remote gasholder station is indicated back to the control room. A lamp fitted on the control panel glows and an alarm bell rings. A key is provided to cut off the bell circuit.

A lamp fitted on the control panel glows when a 50 volt apparatus fuse blows. The alarm bell is also rung and a key is provided to cut off the bell circuit.

A transmission lamp is fitted and this glows whenever the line is in use for the transmission of signal to or from the gasholder site.

A test facility is provided on the equipment and this enables selection and control operations to be carried out in the normal manner on a dummy device incorporated in the equipment at the remote site. Indications are also received at the control room from this device. This facility is provided to enable selection, control, and indication routine tests to be carried out on the supervisory equipment without interfering with its normal functioning.

The alarm re-set key enables the control engineer to acknowledge the existence of an uncontrolled change in position by the operation of an alarm contact, and by throwing it downwards he can silence the ringing of the alarm bell. By throwing it upwards he can change the flashing lamp to a steady glow.

A check key is provided to enable the control engineer to check that the lamp indications and meter readings on the control panel are correct at any time. The operation of this key causes a complete indication check signal to be transmitted from the gasholder site to the control room.

The circuits are such that it is not possible to carry out a control on two different pieces of equipment simultaneously and should the control engineer operate two selection keys at the same time a 'key fault' alarm is given. This alarm is both visible and audible and it will be noted that a pair of windows is allocated on the operating plaque to give the visual indication.

An alarm is provided on the control panel to draw the attention of the control engineer to a failure of the main electricity supply at the remote site. At the gasholder site under 'mains fail' conditions, certain adjustments are automatically effected to enable all controls, indications and meter readings to be available. This is, of course, subject to certain limitations—*e.g.*, boosters, etc., could not be controlled.

The equipment is designed to operate from a 50 volts D.C. supply and suitable batteries and charging equipment are provided. The charging equipment is designed to operate from the local 230 volts A.C. electricity supply.

The indicating lamps are normally illuminated from the 230 volt A.C. supply via a step-down transformer, but should the supply fail for a short period, the lamp supply is automatically switched to the battery. Under these conditions in order to conserve power, the lamps would only be lit when a selection was being made or a changed indication displayed.

It is not claimed that the equipment is either flameproof or intrinsically safe so that it should be housed in a building having a reasonably gas-free atmosphere.

The control methods for movement of gas have been emphasised as it is a subject which has assumed greater importance now that grouping is resulting in the development of many interlinkage schemes. The larger units with their district stations have had experience of movement control for some years, but its application to smaller groups is relatively new. Exploration of this subject shows its potential value to economic control and management and as a safety measure where district stations are supplied from remote points. The extent of the work involved by interlinkage together with estimated costs is as follows:—

Project	Estimated or Actual Cost £
Bulk supply main to Dalton and Ulverston	
5,060 yds. of 8 in. main	
9,860 yds. of 7 in. main	
1,000 yds. of 6 in. main	26,416
Compression plant	
1—50,000 cu.ft./hr. set (steam)	
1—60,000 cu.ft./hr. set (electric) ...	4,907
Metering and Government equipment ...	1,703
Remote control equipment	8,148
Ulverston holder diaphragm valves ...	426
	£41,600

The immediate major problems in the reorganisation of the distribution systems were:

(a) the areas where pressure deficiencies were most serious,

and (b) the lack of mains and service personnel and equipment.

I have already recounted how a rapid initial survey had revealed that parts of the distributing system were deficient for various reasons, but the absence of pressure recorders maintained at focal points made it difficult to obtain an immediate appreciation of the position. Lack of adequate information as to the age, condition, position, and sometimes the sizes of mains was a further handicap. I think distributing engineers in the smaller groups will agree that the lack of such information (particularly properly maintained pressure records) is one of their biggest problems.

The pressure conditions in the Dalton and Askam area were of the most immediate concern, and here again I must record the value of our headquarter's technical organisation. A distributing engineer had not then been appointed to the group and following upon an appeal for some assistance in dealing with this immediate problem, help was readily forthcoming in surveying the district and preparing a scheme for renewing a considerable proportion of the system starting from outlet holder. Another management problem was readily solved by the co-ordinated efforts of group and headquarters, made possible by the two-tier structure of the Board's organisation. Had Dalton continued to operate as an isolated and independent undertaking this long-standing problem would have remained, having grown beyond their own resources.

Pressure conditions are not yet perfect in this particular area as we have still to complete the tying in and renewal of some secondary mains, renewal of many services, etc. There is also the problem of a small piece of land for an Askam governor, negotiations for which are protracted. To what extent the work carried out so far has benefited consumers, however, can be assessed by the fact that the pressure loss between the station and the terminal end of the feeder main is now 6/10 in. W.G. at peak periods compared with a former pressure loss of 60/10 in. W.G.

In the Barrow area it was found that the major defects were caused by naphthalene and the inadequacy of the Hindpool holder. The attention given to carbonising plant and manufacturing methods reduced the number of consumer complaints mainly attributable to naphthalene from an average of 1,434 per month to 230 per month.

This paper is not intended to deal with the technicalities of production methods to obviate naphthalene, but from the aspect of management I do think that distributing engineers are entitled to expect to receive naphthalene-free gas into their mains. The cost incurred by distributing departments in removing naphthalene from their systems might very well be considered to be a proper charge against production and debited accordingly. Some reorganisation of Barrow's distributing system will be necessary to meet the future requirements of the 1971 forecast detailed in a recent report by the Local Planning Officer of a survey of the movement of population and proposed development within the County Borough called for by the Ministry of Local Government and Planning.

While our present proposals will deal with reasonably onrmal or gradual development, they may need amending in the event of any abnormal industrial development which cannot be foreseen. Large groups supplying big industrial development areas may not find the industrial load potential to be the problem it is to smaller groups.

The immediate problem of mains and service personnel and equipment was relieved, following the appointment of a group distributing engineer, by forming a squad of key men from existing employees for day-to-day routine work, and by putting out new mains projects to contract. Gradually we are equipping this nucleus of personnel, and by training and absorption of experience they are overcoming the initial problem which was aggravated by the loss of men to the water undertakings on the severance of the former joint bodies. Distribution has been the Cinderella of the service for so long, and it is disturbing to note the resultant dearth of skilled men in the theoretical and practical knowledge of this important specialist branch of our industry.

Consumer Service Reorganisation

The first problem to arise under this heading was the lack of showroom facilities (hereafter referred to as gas service centres) and the obvious course was to take steps to acquire these facilities. Dalton and Barrow possessed premises. The Dalton project is completed and the Barrow service centre is in course of construction and is about 50% complete. After much searching, premises were secured at Millom on lease and have been converted to a service centre by our own men. Premises were purchased at Ulverston for their site value and not for their intrinsic worth. By 1952 each undertaking will possess a service centre of a standard appropriate to each district, moulded to a similar general pattern, and sufficiently attractive to be of credit to the area as a whole.

Numerous problems arose to frustrate the speedy establishment of adequate service centres which could only be solved by patient plodding rather than by technical brilliance. There was one problem which did not arise and which contradicts an apparent popular opinion as to the commercial enterprise of a nationalised industry. No red tape in securing decisions arose at Board level to frustrate efforts at local level to attain our objective. The relative ease with which any important matter requiring the attention of the central body can be submitted is a feature of our area organisation which is of the greatest assistance to local management.

The total capital cost to provide the four gas service centres will be approximately £10,100.

The problems of obsolete cookers and old 'lights' meters have been so well ventilated that I will refer to these very briefly. The introduction of the Board's terminable hire standard cooker and an intensive campaign of meter changing will ultimately solve both problems. At the present rate of supply of the standard cooker, however, the 11,000 obsolete cookers we have at present will not be eliminated until 1964, but we expect to have replaced a total of approximately 9,500 old 'lights' meters by 1952.

Much of the efforts of fitting staff had been devoted in the past to the fitting and renovation of black cookers and poor pressure complaints. This class of work having been considerably reduced, it has been possible to divert the activities of these men into more profitable channels. They have been able to handle greatly increased sales of appliances and to devote more attention to appliance maintenance. We are still weak in the matter of appliance maintenance, and it is our intention to introduce a more organised system of routine maintenance at the end of this year when the initial phase of district reorganisation will have cleared up accumulated arrears.

Most of the smaller undertakings have no routine appliance maintenance system and only carry out maintenance when requested by the consumer. The two outstanding reasons for this are—(1) lack of a complete indexed consumer appliance record, and (2) lack of training facilities for personnel in appliance maintenance. The solution of the former is obvious; the solution of the training problem is not so easy for the smaller groups, and the establishment in the area of a pool of qualified instructors at focal points would be a desirable objective. The smaller undertakings have difficulty in obtaining gas fitters as they have only a small population to draw upon to fill any vacancies.

As we have gradually acquired a more organised fittings team at Barrow we are now in a position to give more assistance to the smaller undertakings whenever they experience a shortage of fitting staff.

When small units operated independently it was unusual to find an undertaking provided with any technical assistance and in consequence technical efficiency was often impaired. The three smaller units of the group were no exception and any technical control had to be performed by district managers when they could spare the time from their other multifarious duties. These undertakings were now to have Gas Examiners and become subject to examination.

The obvious course was to provide a technical service for the group centred at Barrow. Knowing the shortage of technical personnel in the industry it was decided to build up a technical service from boys of school leaving age who had received a higher education. It was difficult at first, starting with raw material, but the first two boys to be appointed as student engineers quickly assimilated an initial training and now after two years they are giving considerable help to technical control. We have four such students, all at different stages, attached to production and one student attached to the distributing engineer. By this means we are gradually arriving at a position where we are not only providing a technical service for ourselves but contributing our share to the future personnel of the industry.

The technical training of these students is important. They are all taking a mechanical engineering course which is well provided for locally, but very soon they will need to take a gas engineering course which is not provided. This is a problem for smaller groups which are far removed from the centres which provide such courses. It is a problem which has existed a long time and one to which the industry as a whole should help to find an answer.

Until we can provide the full physical facilities essential to stores control, this aspect of our administration will be weak. In the meantime we are temporising by using the existing limited facilities and revising the stores system. Central buying of main essential stores items is carried out from the group office. Three Nissen huts have been erected to provide storage for service pipes, heavy stores, etc., previously stored in the open. This standard type of ex-army hut could be bought very cheaply, but while they assist in meeting a temporary need they cannot be considered to be a permanent solution.

Transport deficiencies have been met by the acquisition of a small fleet of smart modern vehicles and mobile plant, and how to maintain them so is a problem in a group of small units. The size of the group does not justify a transport officer and until the Hindpool depôt project is completed there are no proper facilities for housing or maintenance.

The problem has been overcome by dispersing control of vehicles among senior personnel according to the vehicles which mainly operate in their particular sections. Each exercises control along a standard pattern thus ensuring that each vehicle receives the same treatment. We have contracts with local garages whereby each vehicle reports monthly for complete service and maintenance check. The garage completes the standard service report form as drawn up by the Board's transport officer and posts this direct to the officer in whose section the vehicle operates.

The Future

At the outset of this paper I stated that reorganisation merely for the sake of reorganisation is futile. Therefore it will be as well to examine what we have to look forward to at the conclusion of the plans, projects, and policies evolved, and to satisfy ourselves that we are proceeding along the right lines. Will the reorganisation benefit consumers? The men and staff who have enthusiastically entered into the spirit of reconstruction believing the changing order to be for their ultimate good—will they be disappointed? Is the capital cost of reorganisation justified?

Visualising the future, it is obvious that the consumer will receive a far better service. The smaller units have the backing of an organisation they have not previously enjoyed, and—as to economy—the cost of our product will be less than it would have been had these small units continued to function separately as independent units. The net cost into holder for the group as a whole for the year ended March 31, 1951, averaged 9.87d. per therm of gas sold as against 10.12d. for the previous 11 months. Based on present day prices this cost should be reduced with the conclusion of full physical link-up. As a guide to technical efficiency the Fuel Expenditure Index for the group as a whole has averaged 27.06%, which can be considered reasonable for a group of small units.

Complete interlinkage will bring to personnel a fresh outlook on the industry, changed duties and responsibilities. Those who initially imagined diminishing prestige should have realised by now how limited was their forward vision. Contrast the lot of a man in charge of a small dilapidated works and an equally archaic office carrying on his shoulders alone the responsibility for continuity of supply, with what he can now look forward to! A smart service centre, a modern control room properly equipped to replace his old producing plant; pride in his consumer record, and dispensing a first-class service to consumers in his district; peace of mind in the greater resources he has available and no more sleepless nights; opportunities to specialise in fields where his interests lie.

At the station where production is centred, there are opportunities for technical staff and those in control to function more efficiently, with a smoother organisation; improved working conditions and opportunities for the men; a greater interest and pride in plant. No pools of labour moved hither and thither indiscriminately first to one job and then another, but in their place organised routine. Purification is the biggest offender in this direction and materialisation of the purifier project for the Barrow works will put this process on a routine and remove one of the major difficulties of works control. Maintenance will largely replace repair and painting will be in the hands of a painting squad working to a planned routine. In short, the smaller units, in combining, will become possessed of those facilities which in the past have always been the prerogative of the bigger units.

As to cost, it will be seen that reorganisation will incur a capital expenditure of £552,760 which is made up as follows:—

	£
Production	433,895
Interlinkage	41,600
Reconstruction of distributing systems...	42,665
Service centres	10,100
Stores, workshops	24,500
Total ...	£552,760

The outstanding debt for the group at the date of take-over was £108,799, so that the total involved of £661,559 is equivalent to £780 per mill. cu.ft. of present gas made—a reasonable figure which can be justified economically, apart from the fact that a large proportion of this expenditure is incurred by reason of deferred repairs and maintenance.

UNITS AND STANDARDS OF MEASUREMENT

THE National Physical Laboratory is preparing a new short series of pamphlets describing the units and standards of measurement employed there. The first of the series, just published, deals with the fundamental units of length, mass and time. The pamphlet also defines the derivatives from these fundamentals—namely, the units of volume, density, and specific gravity and deals with the acceleration due to gravity, as well as with force and pressure, with particular reference to barometric pressure. Both the British Imperial system and the International Metric system are dealt with. The standards in the British system are of course the basis for the whole of our weights and measures and as such they are of cardinal importance to all branches of science and industry.

Some idea of the accuracy attained in the measurement of standards can be seen in the section on time. The section of the pamphlet describing precision clocks says that owing to the nature of the radio signals (broadcast through Rugby from Greenwich), the precision of their comparison with the clocks is limited to a few tenths of a thousandth part of a second, but the inter-comparison of the clocks themselves can be carried out considerably more accurately.

'Units and Standards of Measurement Employed at the National Physical Laboratory. I—Length, Mass and Time' is published for the D.S.I.R. by H.M.S.O., price 9d. (by post 10½d.).

NORTH WESTERN STAFF CONFERENCE

STORES CONTROL AND ACCOUNTING

By P. KNOWLES, Accountant, and ROBERT KERR, A.S.A.A., Deputy Accountant,
North Western Gas Board

THE total value of all stocks and stores held by the Board throughout the area on March 31, 1951, exceeded £4,300,000; it is obvious that the arrangements for housing, recording and accounting for such a large current asset should be highly efficient. Unfortunately, the majority of the systems of stores control and accounting which we inherited from our predecessors were found to be far from satisfactory. In many cases stores buildings were inadequate or not secure against unauthorised entry, materials were being withdrawn from store without properly authorised requisitions, while the records of receipts into stores and stores balances were either unsatisfactory or non-existent.

An efficient system of stores accounting is needed not only in order to account for the balances which should be on hand at any time, but also because issues from stores are one of the main sources of expenditure in an organisation and thus part of the basis of all financial accounting and cost accounting. If management is to be kept fully informed, quarterly financial accounts and periodic cost statements are vital, but such figures cannot be accurately and quickly obtained without a first class system of stores accounting. We must, therefore, have throughout our area an efficient system of stores control and accounting, realising that it will be a corner stone of the whole financial and cost accounting structure.

We feel that some comments on central purchasing and purchase invoice arrangements are advisable because these are the operations immediately before and immediately after the receipt of the goods into store, and the arrangements made to deal with these activities must suitably interlock with our stores control arrangements. Purchasing of all goods and the arrangements for dealing with purchase invoices should be wholly centralised at group headquarters. While this does not mean that some district officer cannot incur any charge in an emergency it does mean that the control of ordering shall be at group level. Emergency action taken at a lower level with due cause can always be confirmed by group headquarters. By central purchasing we mean something much more than the collating of orders from district level into one group order. We envisage a system whereby the chief stores officer, knowing from central stores records the rate of consumption and level of balances held anywhere in the group, can arrange a steady flow of all materials in regular use. The quantities ordered should be the optimum amount as regards price, delivery charges, handling, and storage, and deliveries should keep pace with demand.

If there is a separate order or buying department the chief stores officer will indent for supplies by means of a purchase requisition and he will need to keep in close touch with the order department because forward ordering arrangements need to be adjusted not only for any variation in the period of delay between date of order and delivery but also for variation in the consumption of stores. It is also assumed that the ordering section will, to the best of its ability, in conjunction with the chief stores officer, protect the position against possible shortages and price increases.

The design of order forms varies widely between one organisation and another and this is a document on which everyone seems to have his own particular ideas. Whatever their actual design we feel that the orders should be in four-part sets and not in bound books. A four-part set will provide one copy to the supplier, one copy to be held by the order department, one copy for the storekeeper, who will eventually receive the goods, and one copy for the purchase invoice section.

We feel that all purchase invoices should be sent direct by the supplier to group headquarters and that they should not move around from department to department in the process of being certified. A copy of the order issued will be sent to the purchase invoice section from which they will be able to give their first certification that the goods have been properly ordered. This section should also receive a copy of the goods received return from all storekeepers, thus enabling them to certify whether the goods have been received in good order. In addition they will have their duties of checking prices, calculations, discount, etc., together with the additional duties of coding the invoices.

We would stress one very important point in this connection. No goods should be 'booked' direct to jobs from invoices whatever the circumstances. Even where delivery of mains for a big mainlaying job is made direct to site, these materials should pass through the stores records otherwise the control of such materials both for stores accounting and for cost accounting is lost.

Location of Stores

We wish to ensure that at all times a sufficient quantity of all stores is available at the nearest and most convenient point to use; it would seem that groups will need stores at the following points: Works; distribution and installation depôts; showrooms—appliances, etc., for display purposes; showrooms —minor fittings to sell for cash; maintenance men—small parts required in maintenance work for which the consumer is usually charged.

It may well be that in many cases the works stores and the distribution stores are on the same site, and if this is so we would stress that there is not the slightest necessity for a separate stores account to be operated for works materials and distribution materials. Indeed, such a division leads to difficulty through transfers between one store and another as the works is constantly using distribution materials and the distribution department also uses materials normally classed as works stores.

In addition to the stores arrangements outlined above it is, in our view, most necessary that every group should have a main store. It is not, however, suggested that this should be a store solely to feed all other stores in the group and not itself handling detailed issues to jobs. A central store of that type would obviously be uneconomic owing to a duplication of handling and transport charges, but it is considered that the largest issuing store in the group should be treated as the main store, although at the same time it is issuing materials for works and distribution jobs. Even with such a main store we would still stress the necessity to avoid a duplication of handling and transport costs and feel that arrangements with suppliers should be made to deliver direct to unit stores any articles which are special to those stores or consignments of stock lines which are in regular and substantial use. If we have a main store of this type, balances at all other stores can be kept at the minimum level necessary to guard against fluctuations in supply and the balances at the main store only need to incorporate the reserve necessary to cater for fluctuations in the use of materials.

Considerable savings can result from the reduction of stores balances to the minimum. It should be realised that such savings arise not only from the reduction in the amount of money laid out for stock but also from a reduction in handling charges and in the stores accommodation required.

An undertaking operating on its own before nationalisation and grouping would hold adequate stock balances calculated in part on the basis of its own potential demands and emer-

gencies. Demand can now be evened out, risks of emergency spread, and resources pooled, certainly within the group if not the area, and groups should find that the setting up of a main store will proportionately reduce all stock balances and certainly the emergency items which it is necessary to hold.

It is appreciated that in the case of many materials the question today is not of keeping a minimum stock but of obtaining adequate supplies to carry out all the jobs which the group desires to do; and indeed at times it is wise to take more than the minimum into stock in anticipation of shortages or price increases. On the other hand, where materials can be quickly obtained and prices are stable it is merely wasteful to hold unnecessary quantities in stock.

Throughout the area it seems to be the general and sensible rule that appliances held in showrooms are for display only and that appliances sold are supplied exclusively from stores. With this in mind we suggest that each showroom should normally borrow appliances for display from the most convenient store, and that the store sending these appliances should have an exact record of the items sent out for display. To prevent any discrepancy it is suggested that the officer responsible for showrooms should requisition on the store for appliances needed for showrooms and send two copies of his requisition. The store issuing the appliances will then send both copies to the showroom with the goods, one copy of which will be retained by the showroom and one copy signed and returned to the store. An entry will then be made in a special stores record showing that these appliances are held by that showroom. The showroom itself can keep a record, or in any case will always have available the requisition, which on the return of the appliances to the store in question should be cancelled by a returns note originating in a similar manner.

It seems the general practice in the area that showroom sales are confined to small articles such as rubber ends, flexible tubing, etc., and these are sold for cash and not for credit. These sales must be strictly controlled and we feel that the first safeguard is the fixing of an imprest stock of such fittings, to be replenished at certain specified dates. Thus for any period it is possible to reconcile the cash sales with the stores actually issued to that showroom for cash sale. One method of control is, of course, to book everything out at selling price, but this sometimes causes difficulty, and perhaps a better method is to make arrangements for cash sales to be recorded both in cash and in commodity quantities so that a complete reconciliation can be made for each article. Here again, of course, the stores issued should be covered by a requisition from the showroom, which should retain a duplicate.

Maintenance men circulate throughout the area either on a regular maintenance programme or in response to complaints raised by consumers. The general practice is for the Board to give the labour free but to make a charge for the minor spare parts or materials used by the maintenance man on his visit. The materials supplied are usually small items such as radiants for gas fires and it would be extremely costly to deal with these on a credit account basis.

It would, therefore, seem desirable to supply the maintenance man with an imprest stock of the materials he is usually called upon to use, to provide him with a receipt book, and to make arrangements for reconciling the monies he pays in with the materials he receives from stores. Here again all materials with which he is supplied by stores should be evidenced by a requisition, a copy of which he should retain.

Accommodation for Stores

It is worth while to give careful thought to the preparation of a proper building for the accommodation of stores. There should be adequate room to give easy access by the storekeepers and storemen to any article and the diverse items of stores should be contained in the most suitable receptacles. In any large store a loading bay is essential. This is of great assistance to the stores personnel in unloading consignments of heavy articles while the Board's own vans are much more easily loaded from such a position. Sometimes a disused retort house can provide an excellent basis for a stores building. From the point of loading or unloading, access should, of course, be swift and easy to all parts of the stores.

All stores buildings should be effectively sealed against any unauthorised entry. In theory there should only be one entrance or exit and, unless stores personnel are in control, the building should be securely locked. We know that stores are often required for an emergency after the store has closed for the day or for the week-end, and an emergency key is, therefore, necessary; but such emergency arrangements should be under strict control and not abused.

If stores records are to be mechanised, classification and coding are essential; but even if machines are not available there are great advantages to be obtained from classifying stores materials, coding them and determining a stock unit for each item. Coding results in any particular item being strictly identified, saves written descriptions of items and leads to economy of clerical work on all records. We feel, therefore, that all groups should classify their stores and prepare a stock code giving a number to every article which is held in stock.

Every storekeeper should keep a goods received record and this should be in the form of pre-numbered loose sheets in duplicate of which the top copy should pass each day to the central group office. A *nil* return should be made if there are no receipts during that particular day.

After giving some thought to the question of the actual stores records both at each store and at the central office we have reached the conclusion that the problem can best be met as follows:—

(*a*) By providing quantity records only at each store within the group, which can in most cases be simple manual records, and

(*b*) by providing at the central group office stores records both in quantity and in value. In this latter case the records could probably, with advantage, be mechanised.

The chief stores officer's duties will include the constant review of all re-ordering levels and minimum balances at every store throughout the group. These levels are not fixed figures. They must be frequently reviewed. As there is much misunderstanding on this problem we would like to make our own views clear.

We believe:—

(*a*) That it should be possible to fix for each stores item a re-ordering level which we would define as an estimate of the maximum quantity of that commodity which will be required during the time between the placing of an order and the probable delivery of that order.

(*b*) If the quantity assessed under the above formula is less than the optimum ordering quantity, a further supply should be indented and ordered immediately the stock balance falls to the re-ordering level.

(*c*) If the quantity assessed under the above formula is more than the optimum ordering quantity, regular forward ordering in optimum ordering quantities at suitably spaced intervals should be arranged; it will then also be desirable to fix a minimum stock balance to guard against any failure in promised deliveries.

The re-ordering level, calculated on the basis of (*a*) above, is not a minimum balance which should be maintained at all times and wherever conditions envisaged under (*c*) are ruling, forward ordering is a more economic and just as effective method of guarding against long delivery dates as the holding of colossal quantities in stock.

The main duties of the central purchasing and stores office are as follows:—

(*a*) The fixing and constant review of the re-ordering levels and safety minimum balances for all unit stores and the main store.

(*b*) Forward ordering of all stores in regular use to ensure a steady flow of materials gauged as nearly as possible to demand and thus keeping all balances at the minimum at all stores at all times.

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(*c*) Regular inspection of all stores balances as shown by the central stores records with a view to maintaining the stocks of all commodities not subject to regular forward ordering at the safety level.

(*d*) Having the main reserve at the base store, to redirect deliveries from suppliers between the various stores according to revised needs, thus saving any physical transfer between base store and other stores.

(*e*) Where buying is done in anticipation of a shortage or an increase in price, to have deliveries made direct to all stores according to use.

(*f*) Where emergency stores are held for the group as a whole, the minimum balance may be held at the base store or in part at several stores; but if any particular item will only be needed at one point—*e.g.*, spares for a special works plant—such spares should always be delivered and held at that point.

The main duties of the storekeeper in regard to balances are:—

(*a*) To indent on the chief stores officer for a further supply immediately the balance of any commodity falls to the re-ordering level unless such commodity is already subject to regular forward ordering by the central stores office.

(*b*) In the case of a commodity subject to regular forward ordering to report to the chief stores officer immediately he starts to issue from his safety minimum balance.

(*c*) To report to the chief stores officer unnecessary surpluses of any commodity.

There will always be the possibility of discrepancies arising between the stores record at the central group office and the quantity record at local stores. To keep this matter under constant review we suggest that on the goods received note the local storekeeper should always declare his balance of the commodity at the start of the day on which the goods are received. This should permit the central group office to make an exact comparison between the storekeeper's record and its own and should pin-point immediately any discrepancy. If, of course, any arrangement is made in the stores system for issues to be posted at the end of any period, say at each week-end, the storekeeper should declare his balance at the start of the week and not at the start of the day.

It should be a firm rule that no issue shall be made from stores except against a requisition signed by a responsible official. In addition, the requisition authorising the issue of materials should, except in the case of minor maintenance materials, bear the reference number of the works order or job authority covering the job for which the materials are required.

Pricing of Stores Issues

Of the various methods of pricing there are three which we would consider here:—

(*a*) First in First out:—This method assumes that the item issued was the one held longest in stock and that, therefore, the price of the issue should be the actual price at which that item was originally purchased. We do not consider it a suitable system for us to adopt.

(*b*) Average Price:—This system holds that, where the stock on hand consists of batches of articles bought at different times, the most practicable and reasonable method of pricing any article issued is at the average price of them all. The method followed is to re-average the balance immediately a fresh receipt is brought into stock. All issues thereafter are priced at the new average price. In practice, however, particularly if any grouping of issues is made prior to pricing in connection with machine accounting, it is most convenient to recalculate the average price at the beginning of the period fixed for dealing with issues—*viz.*, weekly. This is the method of pricing stores issued which we have already recommended to the area and which is in our view the most suitable in existing conditions and circumstances.

(*c*) Standard Pricing:—One of the main problems of stores accounting is to ensure speed in all operations, particularly in the pricing in of receipts, pricing out of issues, and calculations of balances in sterling; in running any system one is frequently handicapped by the delay in receiving suppliers' invoices. The advocates of standard pricing say, therefore, that one should pre-determine a price for each commodity handled and price receipts, issues, and balances at this figure. If an invoice is received showing a different price from the standard price the difference is debited or credited to a stores price adjustment account, the balance on which at the end of any accounting or costing period is spread as an overhead. Probably in these days of frequent price movements standard pricing would be very difficult to introduce; but we feel it is a method which we must always bear in mind because it expedites the whole procedure of stores accounting; also in times of stable prices the financial differences tend to be a very small percentage of the total value of the goods passing through the stores. We feel too there is another reason for considering standard pricing in this area. Groups appear to be buying identical commodities at different prices. Even in certain bulk buying arrangements recently made by the Board the invoice price of a certain type of appliance will vary according to the quantity delivered to any store. It would seem, therefore, that when we come to compare the costs of supplying and fixing this appliance as between one group and another we shall have a different price for the appliance; it would seem desirable that this element should be removed if costs are to be strictly comparable. This, of course, can be done by either showing the cost of the appliance as a separate constituent of the total cost, or by using standard pricing and spreading the pricing differences as an overhead which would also be shown separately in any cost statement.

Groups should have physical stocktakers under the direction of the chief stores officer, to go from store to store checking actual stock with book stock. We would stress that their duty is not 'spot' checking but an exhaustive check of the quantity on hand of every item in the store or on the records, so that over a period these men will have checked every balance. Opinion varies as to how many complete rounds per annum such physical stocktakers should do, but in our view they ought to do not less than two rounds nor more than four.

In the system envisaged by this paper there will be quantity records at each store while the complete quantity and value records will be held at group headquarters. Discrepancies can and will no doubt arise between the records at group headquarters and those at local stores; but we have tried to cater for this by arranging for the balances on the quantity records at stores to be declared each time a receipt comes into store. There may also be discrepancies between the quantity records held at the store and the goods actually in stock. It is therefore necessary that prior to their checking the physical stocktakers should be supplied with the stock balances at a certain date according to the records at group headquarters. They will then have two duties:—the investigation and reconciliation of any differences between (*a*) the store quantity records and the group headquarters records, and (*b*) the actual stocks and the balance shown on the store quantity records.

It is most necessary that this perpetual inventory shall be regularly and efficiently carried out because, apart from correcting any discrepancies arising from clerical errors, it will have the advantage of discovering or preventing pilfering of stores. There is also the very great advantage that book stocks can be relied upon at any month—or quarter—end as showing the actual physical stock held by the group; thus the peak of physical stocktaking often experienced at half year or year ends is eliminated.

As well as this constant physical stocktaking made from group level we have the check exercised by the internal audit teams circulating in our area. Their duty is, of course, to carry out spot checking of balances rather than an exhaustive checking of each and every balance of stocks. At the same time they will examine the routine and records to ensure that the directions issued in connection with the system are being

properly carried out, and from time to time will test the whole system by tracing a receipt or an issue throughout the whole of its course.

Usually the Board takes responsibility for coal immediately it has left the pit head, and in our view there should be at each works a comprehensive coal received record.

We feel it is most unfortunate that at most works the coke stock account has to be built up in retrospect. Too often we find the only reliable figure is the sales, and this is supported by some casual measurement of stocks, estimates of the amounts used on the C.W.G. plant and boilers, all designed to fit in with some broadly estimated 'coke made' figure. We would advocate, therefore, that arrangements should be made—

(*a*) To assess scientifically for each plant a figure for coke made per ton of coal carbonised. We understand that this can be done if regard is had to the analysis of the coal carbonised and, in addition, on vertical plants, to the calorific value of the gas made.
(*b*) Weigh or estimate reasonably the coke fed to producers for heating vertical retorts and estimate reasonably the hot coke fed to producers for heating horizontal retorts.
(*c*) If it is accepted that all coke going into stock should be screened, to screen *and weigh* all coke ex retort house—*viz.*, (*i*) for sale: (this is already done); (*ii*) for use on C.W.G. producer gas plants and boilers; (*iii*) into stock. Arrangements such as these would tremendously improve existing systems for the accounting for coke.

The engineer needs the most accurate figures for his technical results, and the accountant, who has the duty of recording the sterling equivalent of technical operations, requires the most reliable data for his financial and cost accounts.

In order that all interested officers at group headquarters should have reliable information of the activities at each of the works throughout the group, we feel it advisable that all works should render a weekly return to group. If these returns were suitably designed to include all necessary information, they could form the basis of the production returns, the weekly Ministry returns, and the financial and costing figures. Such procedure would also give us that synchronisation of technical and financial figures which is so essential. This is, however, a problem which would have to be considered along with our national commitments in respect of the weekly Ministry Returns A.B.1 now compiled by each works; but we feel sure it is a matter which would repay detailed study.

New Accounting System

The introduction of a complete stores accounting system where none existed previously is a major venture and we would like to stress the vital necessity that any such system should be comprehensively designed and the operational routine thoroughly planned before any introduction is made. In particular we would emphasise the following points:—

(*a*) The time spent in carefully designing the records will be found to be amply repaid once the system is operating. It is not sufficient to draw up a document merely by providing on it for the information which at first sight seems to be required. Thought should be given to just what information is necessary and to the best place on that document for that information. If any document is to be used with any other record or any form of mechanisation, consideration should be given to matching the lay-out and ensuring that any machine operation can flow smoothly from the information yielded by the document. Again, in designing documents one should not forget the advantages which accrue from the use of different colours, from the use of different form sizes, and the use of distinctive serial numbers for quick sorting and analysis. Pre-printing of any standard information should always be considered, and pre-numbering is usually desirable.
(*b*) In planning the routine of a system it is desirable that the planner should actually put himself in the place of the persons who will carry out the various duties of the system. He will then be able to consider exactly how the operatives will perform the duties to be assigned to them and determine whether his first plans are the most practicable and efficient means of dealing with the various operations.
(*c*) It is advisable before any new scheme is introduced that everybody who will be concerned in the system should be thoroughly coached in his new duties; written instructions are often advisable. It is also extremely useful when dealing with a system which covers a sequence of operations to assemble everybody so that each man may understand not only his own part in the system but also the other duties which, along with his own, make up the full system.
(*d*) In the initial days of the introduction of a system it is a great help to make available a few skilled personnel who can be on hand at various vital points in the new scheme to ensure its correct working and to deal quickly with any snags which might not have been foreseen.

Future Developments

There would appear to be great possibilities in adopting standard classification and coding of stores for the whole of the area.

To obtain such a standard classification and coding and to obtain the full benefit from the complete interchangeability of stores throughout the area there would seem to be five essentials:—

(*a*) Every item of stock or stores would first have to be described by the same name by all groups.
(*b*) At each group all stocks and stores would then have to be brought together in blocks of similar items prior to more detailed classification.
(*c*) A standard stock unit for each commodity for all forms of measurement would be fixed at the minimum amount of any commodity issued at any time.
(*d*) Standard prices would be fixed for each commodity to remove the element of varying buying prices and delivery charges which result in the same commodity having different prices in different groups.
(*e*) Once items (a) to (d) had been dealt with, each commodity could be coded, and the same articles would then have identical codings and values wherever they were held in stock.

The above may seem over-ambitious at this stage, yet it is a project which is well worthy of consideration for it would seem to have the following advantages:—

(*a*) Any bulk order, allocation, or transfer of standard articles would be considerably simplified, and in the case of more frequently used items such as cookers it might well be that by creating a central control system of monthly figures we could quickly see the flow of receipts and issues and measure the demand for any particular line.
(*b*) While initially we should no doubt find an infinite variety of stores items, it would be possible over a period to work towards standardisation of materials thus reducing the amount of stores held and keeping working capital at a minimum. While local shortages have probably been eased already by group working the proposed system might help any sudden local shortage in the future.
(*c*) The campaign we envisage would enable us to pin-point the difficulties arising out of our inheritance of peculiar types of plant, appliances, etc., for which stores are held or required.
(*d*) It would seem to us that most manufacturers go out of their way to make their particular commodity and its spare parts different from those of their rivals; but surely in our specifications or bulk orders to suppliers we can constantly bear in mind the benefits arising from standardisation of articles, fittings, and spare parts.

MOMENTOUS *Measures*

A DRASTIC MEASURE No. 12

November Fifth comes round again
with squibs and jubilation,
To mark Guy Fawkes' protest against
oppression and taxation.
We wonder what he'd do today
if he'd **OUR** Income Tax to pay.

The abortive Gunpowder Plot was a drastic measure aimed at those in Authority with the hope of removing injustices. The A & M Gas Meter is a modern measure designed to remove all complaints between the Gas Supplier and his consumers.

THE "A & M" METER

A MODERN MEASURE for the Gas Industry

ALDER & MACKAY LTD.

New Grange Works, Edinburgh

Bradford, Manchester, London, Belfast & Cork

SAUNDERS DIAPHRAGM VALVES

With diaphragm isolated mechanism: harmless to contents, unharmed by dangerous fluids.

Write for full technical data

SAUNDERS VALVE CO. LTD., CWMBRAN, MONMOUTHSHIRE.

JOINTS, GASKETS, WASHERS,
in RUBBER or ASBESTOS
CENTRAL MANFG., & TRADING CO. (DUDLEY) LTD.
OLD HILL STAFFS.
PHONE: CRADLEY HEATH 69181 (5 LINES).
"EVERYTHING IN ASBESTOS."

J. BROWN & CO. LTD.
SAVILE TOWN, DEWSBURY, YORKS.
Supply:–
"BROWNOX-de-LUXE" PURIFYING MATERIAL
Purchase:–
SPENT OXIDE

RETORTS MADE GAS TIGHT
when patched with–
ONX SUPER 83 BRAND FIRE CEMENT

A recent testimonial from Gas Dept.
"We are pleased with results obtained after using ONX Super '83' Brand.
"Our settings were very bad, with large cracks in retorts, and portions of wall actually collapsed.
"Now, six months after repairing 28 retorts they appear as sound as ever; we anticipate the life of the settings will be prolonged."

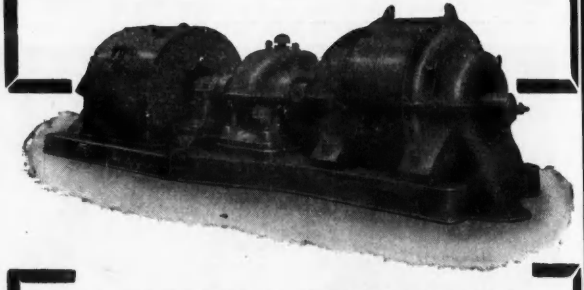
A. L. CURTIS & CO., *Westmoor Works,* **CHATTERIS,** *Cambs., Eng.*

"WASK" HIGH TENSILE MALLEABLE PIPE FITTINGS
OVER 4000 SIZES
INDIVIDUALLY AIR TESTED
STANDARD TAPER THREADS
FULL THICKNESS THROUGHOUT
Fit and forget!

MADE BY THE MAKERS OF–
"Wask" Up and Down Patent Lamp Suspenders, the NON-DISCONNECTING raising and lowering gear.
WALTER SLINGSBY & CO., LTD.
NEW DAM WORKS - - - KEIGHLEY
Phone: Keighley 3749 (2 lines). 'Grams: Malleable Keighley

The GENERAL SERVICE types of
"DEAD-BEAT" PRESSURE & VACUUM RECORDERS
are DBR.892 and DBR.893.
Robust c.i. case—close-fitting door—8" disc chart; vent cock, zero-adjuster, damping valve. Ranges: most requirements are covered by the 176 charts stocked for 24-hour or 7-day record.
ALEXANDER WRIGHT & CO., LTD.
WESTMINSTER, S.W.1.

TURBO-COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.
* * *
We build a complete range of Compressors & Exhausters for air and GAS, suitable for all purposes connected with the GAS industry, including Turbo-Compressors for large capacities, as illustrated below.



WRITE FOR PAMPHLET No. 1018 GIVING PARTICULARS—
REAVELL & CO., LTD.,
RANELAGH WORKS, IPSWICH.
Telegrams: REAVELL, IPSWICH Telephone: 2124 & 5.

CONVEYORS,
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BUNKERS, ROOFS,
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LEEDS.

COAL AND COKE SCREENING & SIZING PLANTS.
RETORT SETTINGS
PRODUCERS, FURNACES
REPAIRS.

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates : Home and Empire :- 52/- per annum ; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements : All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements : Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide ; block screen 120.

BUSINESS MANAGER : S. T. CULLEN

MIDLANDS OFFICE : 10, Union Street, Birmingham.

NORTHERN MANAGER : W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone : Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone : CENtral 2236-7. Telegrams : Gasking, Fleet, London.

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SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.
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GAS PURIFICATION & CHEMICAL COMPANY LIMITED
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Tins for Sale to Consumers. In Bulk for Works Use

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Telephone: CRAWLEY 1212-3. Telegrams: "Balefire, Crawley."

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FOR PUBLIC LIGHTING
CLOCK CONTROLLER REPAIRS.
(A.I.D. approved)
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(CLERKENWELL) LTD.
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WHERE'S YOUR
NU-SWIFT?

The World's Fastest Fire Extinguishers — for every Fire Risk

Pressure-operated by sealed CO_2 Charges

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In Every Ship of the Royal Navy

APPOINTMENTS VACANT

NORTH WESTERN GAS BOARD

MID-CHESHIRE GROUP.

WORKS FOREMAN—RUNCORN WORKS.

APPLICATIONS are invited for the above position at a salary within Grade A.P.T. V (£425-£505 per annum).

The person appointed will be required to supervise all labour in connection with coal carbonisation in machine-stoked horizontal retorts on the Congdon system, coal and coke handling, oxide purification and the usual gas works processes. The applicant should also have a sound mechanical and electrical knowledge.

The successful applicant may be required to pass a medical examination and to subscribe to such superannuation scheme as the Board may adopt.

Applications, suitably endorsed, giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the Group General Manager, North Western Gas Board, (Mid-Cheshire Group), Hartford Manor, Greenbank, Northwich, within fourteen days of the publication of this advertisement.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP.

APPLICATIONS are invited from suitably qualified persons for the following positions :—

1. DRAUGHTSMAN (INDUSTRIAL GAS SALES SECTION).

The salary will be within Grade A.P.T. VII (£500-£580 per annum).
Candidates should be experienced in the design of industrial gas appliances, furnace construction and heating and ventilating engineering work.

2. CARBONISING ASSISTANTS.

The salary will be within Grade A.P.T. VI (£455-£535 per annum).
Applicants must have had experience in the maintenance, operation and efficient working of all types of carbonising plant and will carry out their duties under the direction of the Carbonising Superintendent.

3. SALESMEN IN CHARGE OF SHOWROOMS.

Salford (Chapel Street) Showroom—Grade A.P.T. VI (£455-£535 per annum).
Eccles Showroom—Grade A.P.T. V (£425-£505 per annum).
Swinton Showroom—Grade A.P.T. IV (£275-£460 per annum).
Walkden Showroom—Grade A.P.T. IV (£275-£460 per annum).

Applicants must have had experience of showroom supervision and sales and preference will be given to holders of the Institution of Gas Engineers' Certificate in Gas Salesmanship and Consumer Service.
The successful applicants may be required to pass a medical examination and to subscribe to such superannuation scheme as the Board may adopt.
Applications, appropriately endorsed, giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the General Manager, North Western Gas Board, (Manchester Group), Town Hall, Manchester, 2, within fourteen days of the publication of this advertisement.

FIRST CLASS PRACTICAL FOREMAN ERECTOR/WELDER wanted for interesting specialised work. Must be willing to travel in control of small gangs of Erectors and Welders and must have clean driving licence.
Apply in writing, giving age and experience, to : Managing Director, No. 9975, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

EAST MIDLANDS GAS BOARD

NORTHANTS. SUB-DIVISION.

STONY STRATFORD UNDERTAKING.

WORKS FOREMAN.

APPLICATIONS are invited for the position of WORKS FOREMAN at the above undertaking, which has an annual output of approximately 40 mill. cu. ft.
The manufacturing plant consists of Morris Machine Charged Horizontal Retorts.
Candidates should have had experience in the maintenance of small Works.
The salary will be within Intermediate Grade V (£375/420 Provincial 'B') with Class I. conditions of service.
A newly built four-bedroomed house adjacent to the Works will shortly be available at a reasonable rent.
Applications stating age and experience and giving the names of two referees should be addressed to Mr. J. Corrigan, Sub-Divisional Manager, East Midlands Gas Board, 45, Abington Street, Northampton, to be received not later than November 12, 1951.

C. C. WOOD,
Divisional General Manager.

Millstone Lane,
Leicester.
October 24, 1951.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION.

LINCOLN.

APPOINTMENT
OF SHIFT SUPERINTENDENTS.

APPLICATIONS are invited from suitably qualified persons for the appointment of SHIFT SUPERINTENDENTS for the Bracebridge Works of of the Lincoln Undertaking.
Candidates should have the Higher Grade Certificate of the Institution of Gas Engineers or an equivalent technical qualification. Experience in the control of Woodall-Duckham retorts will be an advantage.
The salary will be within A.P.T. Grade VII of the National Salary Scales (£500-£580 per annum) according to qualifications and experience.
Applications, stating age, qualifications and experience, together with two *copies* of recent Testimonials should be forwarded to the undersigned not later than November 14, 1951.
The appointment will be subject to the provisions of any Superannuation Scheme adopted by the Board, and the successful candidates will be required to pass a medical examination.

J. S. MARSHALL,
Deputy Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.
October 22, 1951.

Classified advertisements continued on Supplement 4)

APPOINTMENTS VACANT (*ctd.*)

HENRY BALFOUR & CO., LTD. require YOUNG ENGINEER as Sales Representative for Gas Works Plant. Must have sound knowledge engineering, be conscientious and able to work on own initiative. Commencing salary £650 per annum; excellent superannuation scheme, good prospects, car provided. Write full details age and experience: Henry Balfour & Co., Ltd., Artillery House, Artillery Row, London, S.W.1.

SOUTHERN GAS BOARD
WESTERN DIVISION.
DRAUGHTSMAN.

APPLICATIONS are invited for the above position.

Applicants must have a thorough knowledge of all Gasworks Plant and have experience in the design of simple structures and the preparation of general building schemes.

Commencing salary will be within Grade VIII of the National Salary Scale (£570-£650 per annum), according to qualifications and experience.

Applications in writing, giving age, experience and qualifications to the undersigned.

JOHN T. JOYCE,
Engineer and General Manager.
Weymouth and Dorchester Gas Undertaking,
Dorset.
October 22, 1951.

WHESSOE LIMITED have the following vacancies in their Erection Department:—

ASSISTANT PLANT ENGINEER to assist with the purchase, allocation and maintenance of welding plant, mobile cranes, derricks and other erection equipment. Considerable amount of travelling involved, as main activity will be examination of plant at site. Applicants should have sound mechanical maintenance experience, with good technical training.

CONSTRUCTION ENGINEER to supervise the erection of large welded storage tanks, gasholders and large plant installations for both Petroleum and Gas Industries. Site erection experience of this or similar plant is essential, together with appropriate technical qualifications. Considerable amount of travelling involved visiting small sites or alternatively resident on major contracts.

CONSTRUCTION ENGINEER to assist with the organisation and control of site work as above, at Head Office. Appropriate technical qualifications and previous experience as Resident Construction Engineer are essential.

Applications in writing, giving date of birth and setting out full details of qualifications and experience for the above posts, should be addressed to The Secretary, Whessoe Limited, Darlington.

NORTH THAMES GAS BOARD

THE FOLLOWING Drawing Office Staff are required in the CHIEF ENGINEER'S DEPARTMENT.

1. JUNIOR DRAUGHTSMEN (3) at BECKTON, E.6; SLOUGH, BUCKS.; and LEA BRIDGE, E.10. Applicants should preferably have had some experience in the maintenance of gas plant and be conversant with the design of steel structures and lay-out of buildings. Starting salary within the range £295 per annum to £535 per annum, according to age, qualifications and experience.
2. DRAUGHTSMEN (2) at WESTMINSTER.
   (*a*) Experienced in the design, layout and detailing of mechanical handling plant.
   (*b*) Experienced in the design, layout and detailing of any of the following:—Coal Carbonising Plant, Coke Oven Plant, By-Products Plant, Pipe Layouts or Steel Framed Structures.

Applicants should be about 30 years of age. Starting salary within the range £570 per annum to £650 per annum, according to age, qualifications and experience.

All the above appointments are of a permanent nature and pension arrangements will be discussed at interviews. Applications, stating age and full particulars of training and experience, should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church St., W. 8, quoting reference number 79.

WALES GAS BOARD
RHYMNEY AND ABER UNDERTAKING.
DISTRIBUTION ENGINEER.

APPLICATIONS are invited for the position of DISTRIBUTION ENGINEER who will be responsible to the General Manager of the above undertaking.

Applicants should possess as a minimum qualification the Higher Grade (Supply) Certificate of the Institution of Gas Engineers, or an equivalent qualification, and should have had a wide experience of high and low pressure main laying and of modern distribution and utilisation of gas. The duties of the successful applicant will also include the control of the undertaking's compressing and holder stations.

The commencing salary will be within the range of £700 to £800 per annum.

A modern bungalow will be made available at a reasonable rental.

The appointment will be subject to a medical examination and to such superannuation regulations as the Board may adopt.

Applications, stating age, training, experience, qualifications, etc., giving the names of two referees should be sent to the undersigned not later than November 14, 1951.

Wales Gas Board, D. I. ROWLANDS,
Rhymney & Aber Undertaking, General Manager.
St. Martin's Road,
Caerphilly, Glam.

RESEARCH KITCHEN DEMONSTRATOR. Applications are invited for a position with a leading firm of Gas Cooker Manufacturers in the Birmingham area. The position is for a lady preferably with considerable experience in Cooking, and who must possess a flair for compiling and testing new recipes. The work will also involve some demonstrating to outside organisations. The successful applicant should hold a recognised Diploma in Domestic Science or equivalent qualifications. Applications giving full details of age, experience and salary required to No. 9976, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

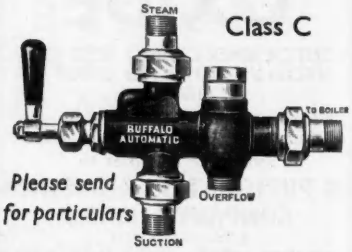
PLANT FOR SALE

PHONE 98 STAINES

FOR SALE: Steel Enclosed Belt/Bucket ELEVATORS—37 ft. centres.
80 ft. Slat CONVEYOR by Mitchell—30 in. wide slats.
R.S. RECEIVERS—24 ft. × 3 ft. 6 in. (two).
14 ft. × 4 ft., 12 ft. × 3 ft. (225 w.p.), and many others.
DIESEL LOCO. 20 h.p.—24 in. gauge.
Egg Ended Tar STORAGE R.S. TANK—34 ft. × 5 ft. 6 in.
Egg Ended OIL STORAGE TANK 30 ft. × 6 ft. 6 in.
Rectangular and Sectional TANKS.

HARRY H. GARDAM & CO., LTD.

BUFFALO INJECTORS



Class C

Please send for particulars

GREEN & BOULDING, Ltd.
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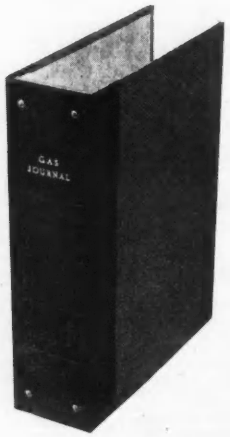
Bind your JOURNAL each week



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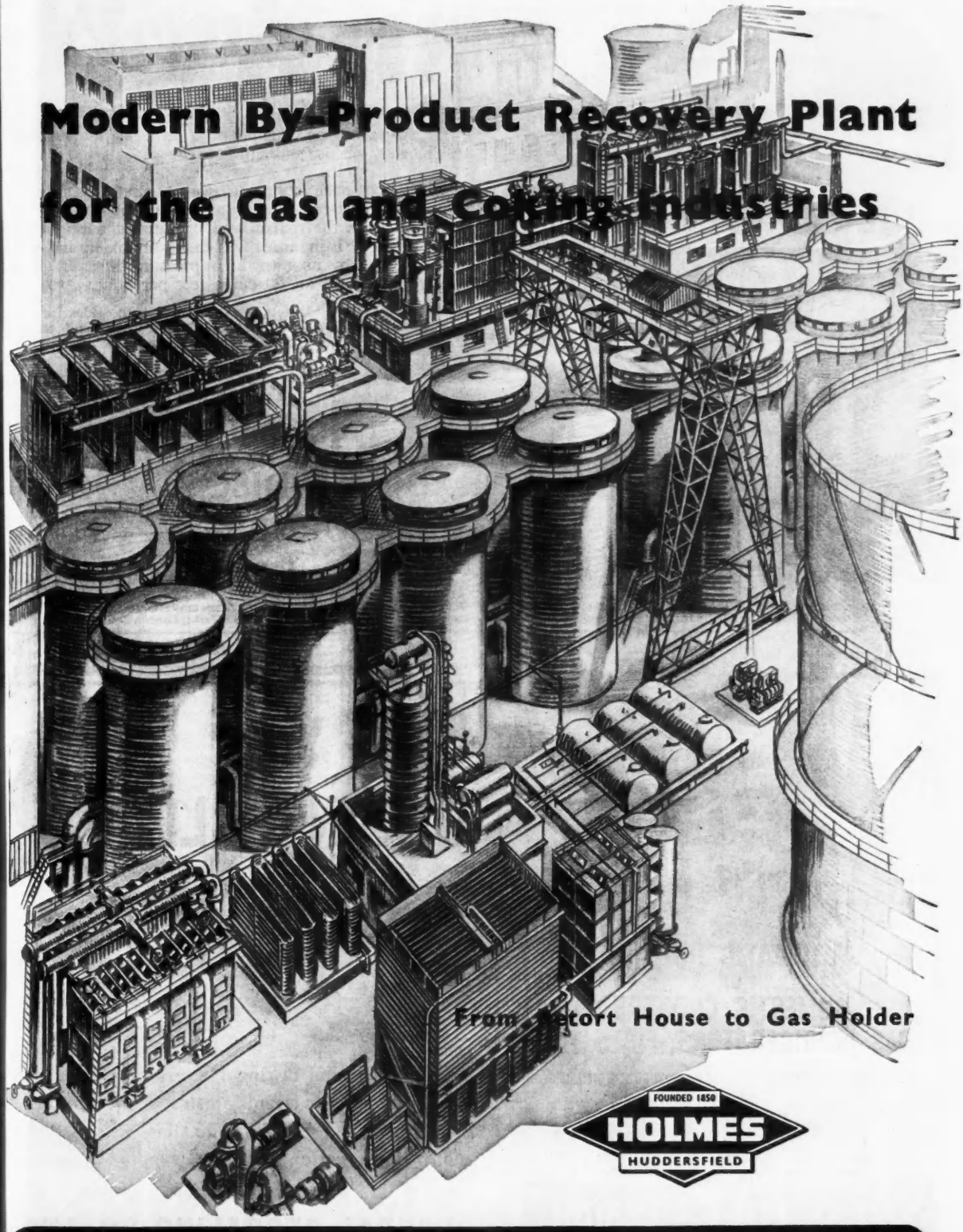

FOUNDED 1850
HOLMES
HUDDERSFIELD

W. C. HOLMES & CO. LTD HUDDERSFIELD · LONDON · BIRMINGHAM

Tel. : Huddersfield 5280. London, Victoria 9971. Birmingham, Midland 6830.

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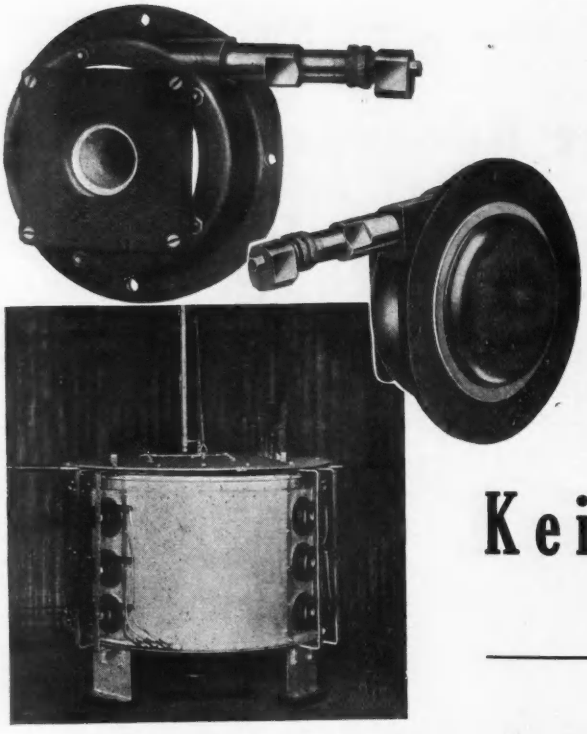

THIS is a medium temperature infra-red radiant heat burner for use on high pressure gas supplies only, say 3 to 5 lbs. per square inch, and it can be fitted to any type of oven or any travelling tunnel or stationary tunnel. A heat-resisting metal disc of about 4 inches diameter forms the radiant and operates at a bright red heat. The disc is mounted in a cast iron holder, and each holder is fed by its own high pressure injector. Gas consumption is about 20 cubic feet per hour.

THE illustrations show, at the top, both sides of the KEITH BLACKMAN Radiant Disc Burner, and at the bottom six of twelve burners applied to a paint drying oven.

Keith Blackman
RADIANT DISC
—GAS BURNER—

Price on application

KEITH BLACKMAN LTD., MILL MEAD ROAD, LONDON, N.17. TN: TOTTENHAM 4522. TA: "KEITHBLAC NORPHONE LONDON."
Branch Offices in Manchester, Birmingham, Leeds, Newcastle-on-Tyne, Glasgow, Penarth nr. Cardiff, and Belfast. Works: London and Arbroath.

333/11

Metolite
REGD.
LIGHTER FLINTS

FOR
AUTOMATIC IGNITION
OF
DOMESTIC COOKERS
GAS REFRIGERATORS, FIRES, ETC

SUPPLIES OF ALL TYPES NOW AVAILABLE TO PUBLIC UTILITIES

ESTD. 1928

BRITISH FLINT & CERIUM MANUFACTURERS LTD
TONBRIDGE · KENT

TELEPHONES: TONBRIDGE 2753 & 2970
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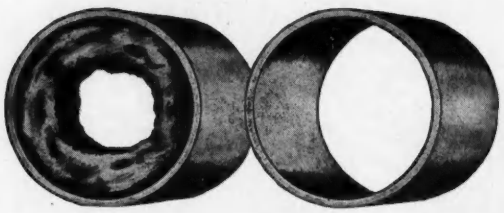
(CONTRACTORS TO H.M. GOVERNMENT)

• Are Your
• MAINS CLEAN?



The Horizontal Boring Method employed is 100% effective in cleaning mains, a considerable length being treated at one time with hardly any interruption to the supply of gas.

Full information from

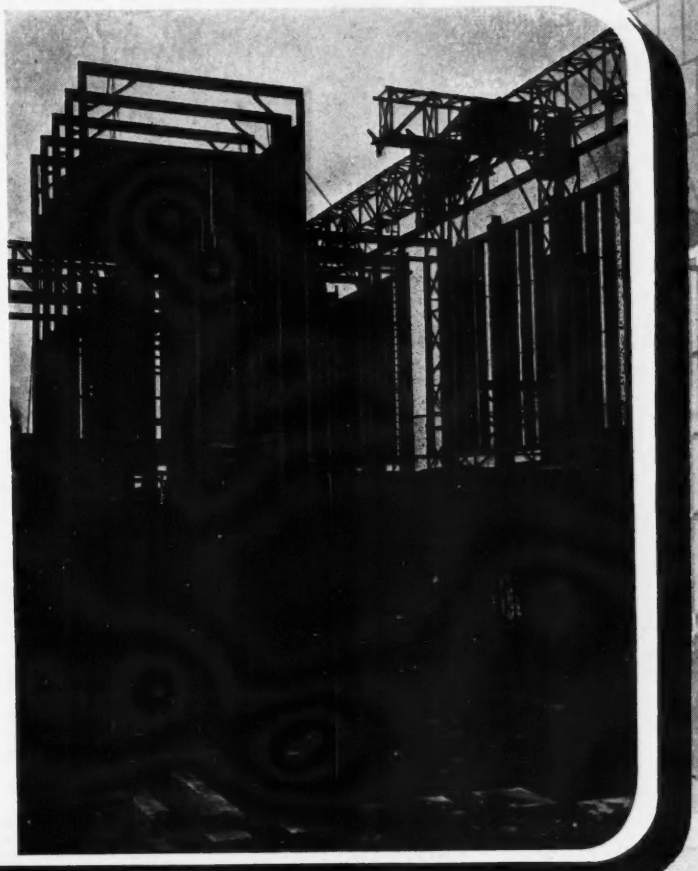
GENERAL DESCALING CO. LTD.

289, HANOVER STREET, SHEFFIELD 3

Phone : Sheffield 21202-3 *Telegrams : Descaling, Sheffield 3*

Printed by STRAKER BROTHERS LTD., E.C.2, for WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4. Wednesday, October 31, 1951.

Work in progress



COVENTRY,

Foleshill Works

Benches G.H. & J. under construction, each comprising 24, 50 inch Glover-West Vertical Retorts.

West's Gas IMPROVEMENT CO., LTD.

MILES PLATTING, MANCHESTER, 10

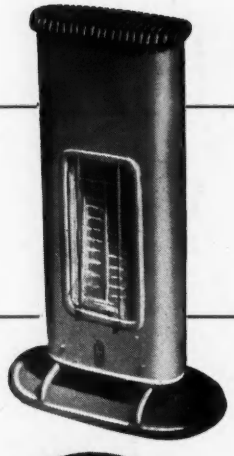
Telephone: COLlyhurst 2961-5. Telegrams: Stoker, Manchester.

London Office: COLUMBIA HOUSE, ALDWYCH, W.C.2. Telephone: HOLborn 4108-9. Telegrams: Wesgasco, Estrand.

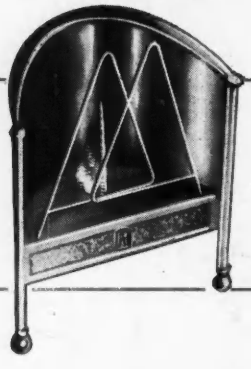
These gas fires are easy to sell

NEAT

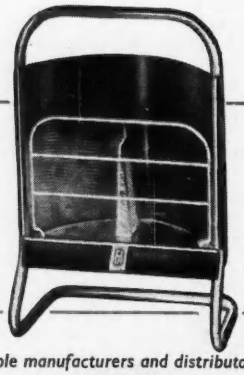
F. A. Neat gas fires incorporate Neat gas jets. They are silent, safe and cannot light back, yet give perfect combustion with exceptional heat output for gas consumed. All are made of fine quality materials by the makers of the famous Ascot gas water heaters and to the same high standards. They can easily be carried from room to room.



CONVECTOR FIRE, FA/7.
An attractive background heater, fitted with four Neat burners which heat a pair of fire-clay radiants. Ideal for halls or landings. Finished in cream.



'MIJ' PORTABLE GAS FIRE, FA/8.
Has an unbreakable chrome steel radiant and three Neat burners. Suitable for small rooms or localised heating.



PORTABLE GAS FIRE, FA/3.
Also has an unbreakable chrome steel radiant of high efficiency. Ideal for the medium sized room.

Sole manufacturers and distributors

ASCOT GAS WATER HEATERS LTD. ASCOT *43 PARK STREET · LONDON · WI · GRO 44*